



*Personal Computer
Hardware Reference
Library*

Hardware Maintenance and Service

Volume 1

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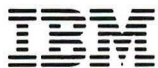
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INSTRUCTIONS TO USER

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the operating instructions, reference manuals, and the service manual, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

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- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- If peripherals not offered by IBM are used with this equipment, it is suggested that you use shielded, grounded cables with in-line filters, if necessary.

If necessary consult your dealer service representative for additional suggestions.

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CAUTION

This product is equipped with a line cord and plug for the user's safety. It is to be used with a properly grounded receptacle to avoid possible electrical shock.

Safety Inspection Guide for IBM Service Personnel

Machine Type 5155 Model 068

Use this Safety Inspection Guide to identify potentially unsafe conditions when inspecting this product. In addition, exercise good judgement to identify potential safety hazards not covered by this guide. Determine any unsafe conditions, the severity of the hazard, and whether to continue without first correcting the condition.

Begin the checklist with the IBM Portable Personal Computer's power off and the power cord removed from the power receptacle. Follow all safety procedures as defined in "Electrical Safety Training Course For IBM Service Representatives" (Self-study Course Number 77170).

It is advised that all non-IBM devices be removed by the user from the system unit before conducting the safety inspection.

Covers, Power Off

Check all internal and external covers for sharp edges that may cut or scratch.

Check the six inserts in the shroud to which the bezel is secured. Ensure that the inserts are tight and will not pull out of their mounting holes.

Covers, Power On

No checks are required.

Keyboard, Power Off

Check the keyboard release latch and locking pins. Ensure that the keyboard is securely locked to the system when in a transportable mode.

Keyboard, Power On

No checks are required.

Display, Power Off

Check the top of the display for the safety label.

Check the bristol screws that lock the display in place. Ensure that the top safety cover has not been modified or altered.

Display, Power On

No checks are required.

Primary Power, Power Off

Check the power cord on the IBM Portable Personal Computer and all attached units for worn or damaged insulation.

Check the power cord ground pins on the IBM Portable Personal Computer and all attached units for continuity from end to end.

Check the chassis of the IBM Portable Personal Computer and all attached units for a common ground when cabled together.

Check the Power switch for snap action.

Check the power cord connector on the rear of the IBM Portable Personal Computer for continuity between the center pin and the chassis.

Check the power cord connector on the rear of the IBM Portable Personal Computer for an open between each of the outside pins and the chassis.

Check the top of the power supply for the safety label.

Check the input-voltage selector switch for free operation. Ensure that the switch remains in the position selected.

Check the power supply covers for a tight fit with no missing screws. Ensure that the power supply covers have not been modified or altered.

Primary Power, Power On

Check the power supply fan operation by listening at the rear of the unit.

Check for the successful completion of the power-on self test (POST) diagnostics.

Safety Label

CAUTION!

Do not remove this cover.
Trained service people only.
No serviceable components inside.

HAZARDOUS AREA

ATTENTION!

Ne pas ouvrir les couvercles sous aucun pretexte.
Reservee au personnel autorise.
Il n'y a pas de composants qui puissent etre entretenus par l'utilisateur ou en clientele.

ZONE DANGEREUSE

VORSICHT!

Abdeckungen unter keinen Umstanden abnehmen!
Zutritt nur fur ausgebildetes personal.
Es sind keine vom Benutzer oder vom Service zu wartende Bauteile vorhanden.

GEFAHRENZONE

ATTENZIONE!

Non aprire il coperchio in nessun caso.
Solo personale addestrato.
Non ci sono componenti che possono essere sottoposti a servizio dall'utente o fuori fabbrica.

PERICOLO

PRECAUCION!

Las cubiertas no deben abrirse bajo ninguna circunstancia.
Solo personal mantenimiento qualificado.
No hay partes que puedan recibir mantenimiento por el usuario o otros.

AREA PELIGROSA

Notes:

Preface

This manual provides the information needed to isolate and repair failures of the IBM Portable Personal Computer system. Readers should have received training on this system.

This manual is contained in two volumes. Volume 1 includes Sections 1, 2, and 3. Volume 2 includes Sections 4, 5, 6, and 7.

SECTION 1, "INTRODUCTION," provides a general description of the IBM Portable Personal Computer and its options.

SECTION 2, "INTRODUCTION TO DIAGNOSTICS," contains the diagnostic menu reference and explains the three diagnostic aids.

SECTION 3, "PROBLEM ISOLATION CHARTS," provides step-by-step instructions that lead you to the failing field replaceable unit (FRU).

SECTION 4, "LOCATIONS," shows the locations of the various components in the IBM Portable Personal Computer system.

SECTION 5, "REMOVAL REPLACEMENT AND ADJUSTMENTS," has all information needed to remove, replace, and adjust any of the FRUs in the IBM Portable Personal Computer system.

SECTION 6, "SWITCH SETTINGS," provides the switch settings, jumper positions, and setup information for the IBM Portable Personal Computer system.

SECTION 7, "PARTS CATALOG," contains illustrations and part numbers for all of the FRUs.

IBM Portable Personal Computer operating instructions are found in the *Guide to Operations*, IBM item number 6936571. Detailed hardware and interface information is found in the *IBM Portable Personal Computer Addendum to the Technical Reference*, IBM item number 6936572 and the *Personal Computer XT Technical Reference*, IBM item number 6025005.

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SECTION 1. INTRODUCTION

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Introduction

The IBM Portable Personal Computer is a compact, portable, desktop computer with a built-in carrying handle. It has a variety of options that let you tailor the system to meet your needs.

The system unit contains the 8088 Processor, a built-in, 22.7 cm (9 in.) IBM Portable Personal Computer display, a Slimline Diskette Drive (with room for an additional drive), a Diskette Drive Adapter, a Color/Graphics Monitor Adapter, and five additional expansion slots into which you can install a variety of options to expand the capabilities of your system.

The capabilities of the IBM Portable Personal Computer system can also be expanded by the addition of an expansion unit option. The expansion unit adds a fixed disk drive and six expansion slots to your system. It also has a receiver card, a data/control cable, and a fixed disk control adapter. An extender card (to be installed in a system-unit expansion slot) and an expansion unit cable are provided with the expansion unit option.

The IBM Portable Personal Computer can manage a wide range of ac voltages because of its switchable, dual-input-voltage power supply.

Input to the system unit is through an 83-key keyboard that can be attached to the face of the system unit for carrying. The keyboard includes a numeric keypad and 10 function keys. and connects to the system unit with a 76 cm (30 in.) coiled cable, which allows the keyboard to be moved to a comfortable operating position.

Other Options Available for the IBM Portable Personal Computer

- IBM Color Display
- Math Coprocessor
- Printer Adapter
- Asynchronous Communications Adapter
- Alternate Asynchronous Communications Adapter
- Binary Synchronous Communication (BSC) Adapter
- Alternate Binary Synchronous Communication Adapter
- Synchronous Data Link Control (SDLC) Communications Adapter
- Game Control Adapter
- 64/256KB Memory Expansion Option
- Prototype Card
- Expansion Unit
- IBM Graphics Printer
- IBM Compact Printer
- IBM Color Printer
- Cluster Adapter

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SECTION 2. INTRODUCTION TO DIAGNOSTICS

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Introduction

This section describes the three main diagnostic aids: the power-on self test (POST), advanced diagnostics, and problem isolation charts (PICs). You do not have to read this section each time an error occurs, but it is a useful reference until you have a good command of the three aids.

Power-On Self Test

We recommend that you do the POST and then the advanced diagnostics each time you service the IBM Portable Personal Computer or add an option.

The POST runs each time the system-unit power is switched on. The POST takes 23 to 90 seconds to finish, depending on the amount of memory installed.

The POST checks the operation of the following:

- System board
- Memory
- Internal display
- Keyboard
- Diskette drives
- Fixed disk drives

To perform the POST, do the following steps:

1. If the expansion unit is attached, set its Power switch to On.
2. Set the system unit's Power switch to On.
3. Turn the Brightness and Contrast knobs fully clockwise, and then adjust to desired brightness and contrast.
4. While the system-unit memory is being tested, the memory size appears in the top left corner of the screen and increases in 16K increments. The cursor blinks under the first number and continues to blink until the total system-unit memory has been tested.
5. A short beep sounds when the POST ends successfully.
6. The IBM Personal Computer BASIC screen presentation appears if a program diskette is not loaded in the diskette drive, or an operating system from a fixed disk drive in the optional expansion unit, is automatically loaded.

POST Errors

If the system unit does not complete the POST, a failure indication occurs.

Make a note of any error as soon it appears. If several errors occur, troubleshoot the one that occurs first.

The following are examples of some errors you could have during POST:

- The screen is blank or the presentation is not correct.
- The audio response is incorrect (no beep or more than one beep).
- You receive error messages such as:
 - 601
 - XXXXX XX201
(is any alphanumeric character)
 - Or even a combination like:
30000 00 201
601

If, during the POST, an error message appears on the screen, the next line displayed is:

ERROR (Resume = "F1" Key)

If you press the F1 key, the system will bypass the error and attempt to complete the POST. Depending on the error, the system may or may not complete the POST.

Note: If you receive any error indications during or at the completion of POST, your next step will always be to note the error, and then go to Section 3, page 3-3 "Start".

1801
XXX KB OK
ERROR. (RESUME = "F1" KEY)



Problem Isolation Charts (PICs)

When using the PIC's always begin on page 3-3.

Start

This is the entry point for all of the PICs. The PICs will help you determine which FRU is causing any of the following conditions:

"Start" directs you to the appropriate PIC for your error indication.

Graphics Printer

Error

Diagnostic Action

Display

You have entered this PIC because you have a 50X error code or have identified a display problem.

er switch to Off.
s are properly
print head to the
et the printer's

Math Coprocessor

You have entered this PIC because you have a 7XX error code or have identified a Math Coprocessor problem.

1. Set the Power switch on the system unit (and

em unit (and
ff.
nd wrap plugs from
ons. A printer and

The PICs guide you through a series of steps and the use of the Advanced Diagnostics diskette to identify the failing FRU.

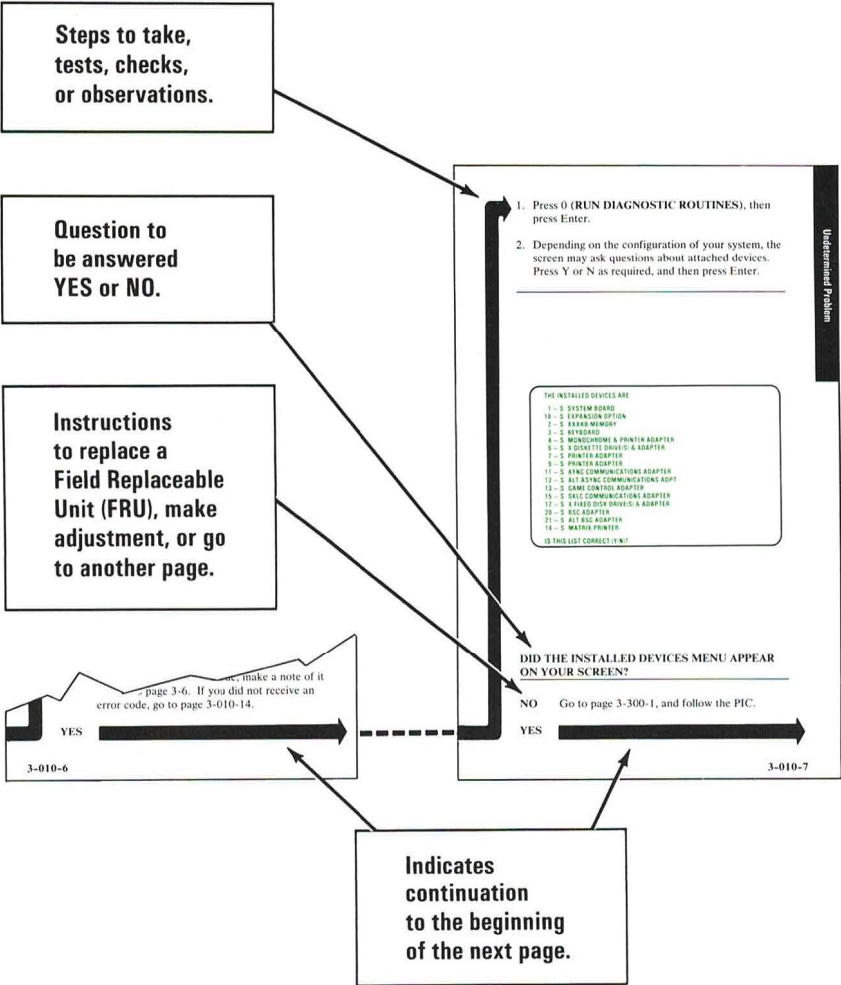
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The "Removal Replacement and Adjustments" section guides you through the completion of the repair.

The figure below is an example of a page from the PICs and shows how to use the information that is provided.



Advanced Diagnostics

You can load the advanced diagnostics in one of two ways:

If your IBM Portable Personal Computer is off:

1. Insert the Advanced Diagnostics diskette in drive A and close the diskette drive.
2. Set the expansion unit's (if attached) and the system unit's Power switch to On.

Note: After the POST, the advanced diagnostics will load and the Option Selection menu appears on the display.

If your IBM Portable Personal Computer is on:

1. Insert the Advanced Diagnostics diskette in drive A.
2. Close the diskette drive.
3. Press and hold the Ctrl key and Alt key, and then press the Del key. Release all three keys.

Note: The advanced diagnostics load and the Option Selection menu appears on the screen.

Special Key Functions

Keys that have special functions for the advanced diagnostics are:

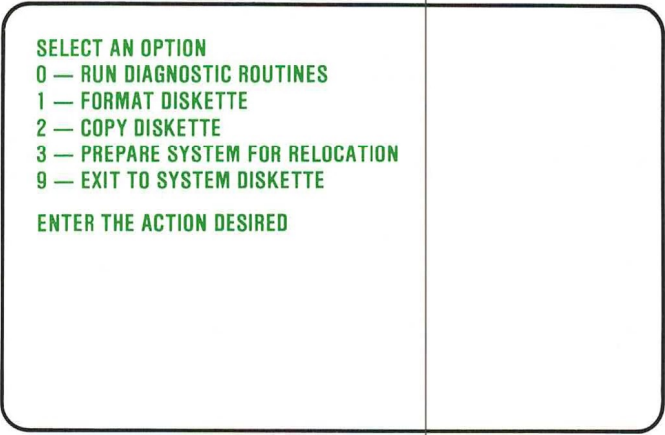
Keys	Function
F7	Moves the screen message to the left.
F8	Moves the screen message to the right.
Ctrl + P	Directs the screen message to the printer.
Ctrl + N	Cancels output to the printer.
Ctrl + C	Stops diagnostics and returns to the Installed Devices menu.
Ctrl + S	Stops diagnostics. Press any key to continue.

Diagnostic Menus

These pages describe the main diagnostic menus and what each selection tests.

Options Selection menu

The Options Selection menu is the first one displayed after you load the advanced diagnostics.



```
SELECT AN OPTION
0 - RUN DIAGNOSTIC ROUTINES
1 - FORMAT DISKETTE
2 - COPY DISKETTE
3 - PREPARE SYSTEM FOR RELOCATION
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED
```

0 - RUN DIAGNOSTIC ROUTINES - Selects the Installed Devices menu.

1 - FORMAT DISKETTE - Formats a diskette for diagnostic use only.

2 - COPY DISKETTE - Copies the Advanced Diagnostics diskette to another diskette.

3 - PREPARE SYSTEM FOR RELOCATION - Sets up the fixed disk drive head in preparation for moving the system.

9 - EXIT TO SYSTEM DISKETTE - Loads the program from the diskette in drive A.

Installed Devices

THE INSTALLED DEVICES ARE

1 - S SYSTEM BOARD
18 - S EXPANSION OPTION
2 - S XXXKB MEMORY
3 - S KEYBOARD
4 - S MONOCHROME & PRINTER ADAPTER
6 - S X DISKETTE DRIVE(S) & ADAPTER
7 - S PRINTER ADAPTER
9 - S PRINTER ADAPTER
11 - S AYNC COMMUNICATIONS ADAPTER
12 - S ALT ASYNC COMMUNICATIONS ADPT.
13 - S GAME CONTROL ADAPTER
15 - S SDLC COMMUNICATIONS ADAPTER
17 - S X FIXED DISK DRIVE(S) & ADAPTER
20 - S BSC ADAPTER
21 - S ALT BSC ADAPTER
14 - S MATRIX PRINTER
IS THIS LIST CORRECT (Y/N)?



- Y** - Advances to the System Checkout menu.
- N** - Allows you to add or delete items from the Installed Devices menu.

Note: If you enter N (**IS THE LIST CORRECT (Y/N)?**), the screen displays a **199** error message. Disregard this error and try to add or delete the options. After trying to add or delete options, answer Y to continue running the diagnostics.

If you are unable to correct the list, you must answer Y to continue.

System Checkout

SYSTEM CHECKOUT

- 0 – RUN TESTS ONE TIME
- 1 – RUN TESTS MULTIPLE TIMES
- 2 – LOG UTILITIES
- 9 – EXIT DIAGNOSTIC ROUTINES

ENTER THE ACTION DESIRED



0 - RUN TESTS ONE TIME - Runs the diagnostic tests once (advances to the Test Selection menu).

1 - RUN TESTS MULTIPLE TIMES - Runs the diagnostic test one or more times without operator intervention (advances to the Test Selection menu).

2 - LOG UTILITIES - Allows you to use the error log and time-of-day functions (advances to the Log Utilities menu).

9 - EXIT DIAGNOSTIC ROUTINES - Returns to the Option Selection menu.

Test Selection

```
1 - S SYSTEM BOARD
18 - S EXPANSION OPTION
2 - S 128KB MEMORY
3 - S KEYBOARD
4 - S MONOCHROME & PRINTER ADAPTER
5 - S COLOR/GRAPHICS MONITOR ADAPTER
6 - S 2 DISKETTE DRIVE(S) AND ADAPTER
9 - S PRINTER ADAPTER
11 - S ASYNC COMMUNICATIONS ADAPTER
12 - S ALT ASYNC COMMUNICATIONS ADPT
13 - S GAME CONTROL ADAPTER
15 - S SDLC COMMUNICATIONS ADAPTER
17 - S X FIXED DISK DRIVE(S) AND ADAPTER
14 - S MATRIX PRINTER

ENTER THE NUMBER(S) OF OPTIONS TO TEST OR PRESS ENTER TO
SELECT ALL OPTIONS ? - / -
```

You select the options to be tested by entering their corresponding numbers, separated by commas or spaces. To test all options, press Enter.

1 - SYSTEM BOARD - Tests major elements of the system board.

18 - EXPANSION OPTION - Tests the expansion unit, cable, extender card, and receiver card.

2 - XXXKB MEMORY - Tests all random access memory and verifies correct addressing.

3 - KEYBOARD - Tests all key positions, the keyboard cable, and the reset function.

5 - COLOR/GRAPHICS MONITOR ADAPTER - Selects the Color/Graphics Monitor Adapter menu.

6 - X DISKETTE DRIVE(S) AND ADAPTER - Selects the Diskette Drive and Adapter menu.

7 - MATH COPROCESSOR - Tests the Math Coprocessor.

9 - PRINTER ADAPTER - Tests the Printer Adapter with the Printer Adapter wrap plug (IBM Part 8529228).

11 - ASYNC COMMUNICATIONS ADAPTER - Tests the Asynchronous Communications Adapter with the asynchronous communications adapter wrap plug (IBM Part 8529280).

12 - ALT ASYNC COMMUNICATIONS ADAPTER - Tests the Alternate Asynchronous Communications Adapter with the asynchronous communications wrap plug (IBM Part 8529280).

13 - GAME CONTROL ADAPTER - Tests the Game Control Adapter. Joy sticks are required to run this test.

15 - SDLC COMMUNICATIONS ADAPTER - Tests the SDLC Communications Adapter and the Communications Adapter Cable, if attached, with a wrap plug (IBM Part 8529280).

17 - X FIXED DISK DRIVE(S) AND ADAPTER - Selects the Fixed Disk Drive and Adapter menu.

20 - BSC ADAPTER - Tests the Binary Synchronous Communications (BSC) Adapter and the Communications Adapter Cable, if attached, with a wrap plug (IBM Part 8529280).

21 - ALT BSC ADAPTER - Tests the ALT BSC Adapter and the Communications Adapter Cable, if attached, with a wrap plug (IBM Part 8529280).

22 - CLUSTER ADAPTER - Tests the Cluster Adapter with its terminating plug (IBM Part 6320352). The screen presentation will show the location of Cluster Adapter number 1 and the total number of Cluster Adapters installed.

14 - MATRIX PRINTER - Tests the printer cable and prints character sets on the printer.

29 - COLOR PRINTER - Tests the printer cable and prints character sets on the printer.

33 - COMPACT PRINTER - Tests the printer cable and prints character sets on the printer.

Log Utilities

LOG UTILITIES

- 0 — START ERROR LOG
- 1 — STOP ERROR LOG
- 2 — LIST LOG
- 3 — SET TIME OF DAY
- 4 — DISPLAY TIME OF DAY
- 9 — RETURN FROM UTILITIES

ENTER THE ACTION DESIRED

0 - START ERROR LOG - Starts a record log of failures detected by diagnostic tests. You can choose to place the log on either the diskette or the printer. If logging to diskette, use a copy of the Advanced Diagnostics diskette that is not write-protected.

1 - STOP ERROR LOG - Stops recording failures detected by diagnostic tests.

2 - LIST LOG - Displays the errors that were logged onto diskette.

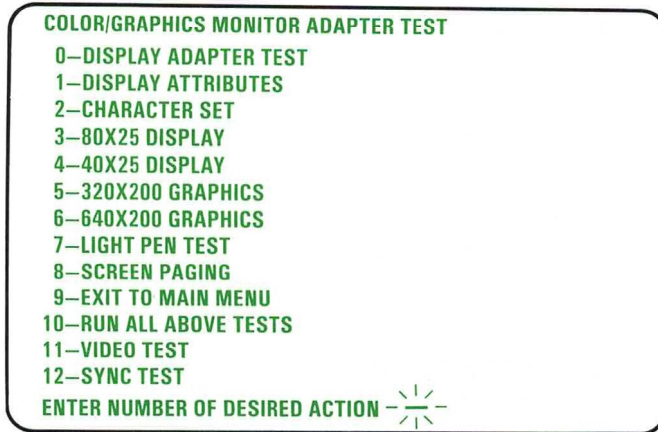
3 - SET TIME OF DAY - Directs you to set the current time of day, using a 24-hour clock.

4 - DISPLAY TIME OF DAY - Displays the current time of day or displays the elapsed time since the diagnostic program was loaded if no time of day was set.

9 - RETURN FROM UTILITIES - Returns to the System Checkout menu.

Color/Graphics Monitor Adapter

This is the menu used to test the Color/Graphics Monitor Adapter, the IBM Portable Personal Computer display, and other direct-drive and composite displays.



0 - DISPLAY ADAPTER TEST - Tests the memory of the Color/Graphics Monitor Adapter.

1 - DISPLAY ATTRIBUTES - Tests the display attribute logic for intensity, reverse video, blinking, non-display, and underline attributes.

2 - CHARACTER SET - Tests character read-only memory (ROM) by displaying all of the available characters.

3 - 80 X 25 DISPLAY - Fills the screen with a ripple pattern of characters using the 80 X 25 display mode.

4 - 40 X 25 DISPLAY - Fills the screen with a ripple pattern of characters with an intensified border, using the 40 X 25 display mode.

5 - 320 X 200 GRAPHICS - Tests the 320 X 200 graphics mode and displays color set 0 and color set 1.

6 - 640 X 200 GRAPHICS - Tests the 640 X 200 graphics mode.

7 - LIGHT PEN TEST - Tests the light pen and related circuitry of the Color/Graphics Monitor Adapter.

8 - SCREEN PAGING - Tests the addressing circuitry from the video controller chip to the Color/Graphics Monitor Adapter memory.

9 - EXIT TO MAIN MENU - Returns to the System Checkout menu, or continues other tests.

10 - RUN ALL ABOVE TESTS - Performs tests 0 through 8.

11 - VIDEO TEST - Provides a test signal to allow voltage measurements at the video, intensity, and composite outputs.

12 - SYNC TEST - Provides a test signal to allow voltage measurements at the horizontal and vertical synchronization outputs.

Note: Section 3, "Problem Isolation Charts", provides the instructions for measuring the voltages in tests 11 and 12. The display's signal cable must be disconnected before doing test 12.

Diskette Drive and Adapter

TESTING — 1 DISKETTE DRIVE(S) & ADAPTER

DISKETTE DIAGNOSTIC MENU

OPTION	DRIVE
1 — SEQUENTIAL ACCESS	ONE DRIVE
2 — RANDOM SEEK	ONE DRIVE
3 — VERIFY DISKETTE	ONE DRIVE
4 — SPEED TEST	ONE DRIVE
9 — RETURN TO CONTROL PROGRAM	

FOR OPTION 9

ENTER "9" AND "ENTER"

FOR OTHER OPTIONS (1 THRU 4)

ENTER OPTION, DRIVE AND "ENTER"

1 - SEQUENTIAL ACCESS - Tests the basic diskette operations with a sequential write, read, and compare of data on all sectors of the diskette.

2 - RANDOM SEEK - Tests the basic diskette operations, including a series of 50 random seeks, each of which is followed by a write, read, and compare of data.

3 - VERIFY DISKETTE - Verifies the access of data at each sector.

4 - SPEED TEST - Measures the time required for one revolution of a formatted, scratch diskette.

9 - RETURN TO CONTROL PROGRAM - Returns to the System Checkout menu or continues other tests.

Fixed Disk Drive and Adapter

TESTING – X FIXED DISK DRIVE(S) & ADAPTER

- 0 – RUN FIXED DISK TEST
- 1 – RUN MEASUREMENTS TEST
- 2 – FORMAT FIXED DISK
- 9 – EXIT FIXED DISK TESTS

ENTER THE ACTION DESIRED ? 

0 - RUN FIXED DISK TEST - Tests the Fixed Disk Adapter and the fixed disk drive's read and write operations.

1 - RUN MEASUREMENTS TEST - Used to measure voltage levels at selected test points.

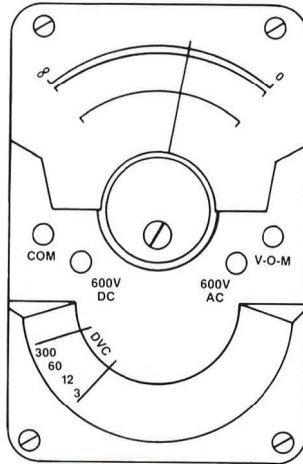
Warning: All data on the fixed disk drive will be destroyed if test 2 is selected.

2 - FORMAT FIXED DISK - Formats fixed disk drive.

9 - EXIT FIXED DISK TESTS - Returns to the System Checkout menu or continues other tests.

Required Tools and Test Equipment

A meter similar to the Triplet Model 310¹



Tweezer-type module puller, similar to the one shown below.
(Used for removal of the 64K memory modules.)



¹ Manufactured by the Triplet Corporation, Buffton, Ohio 45817

SECTION 3. PROBLEM ISOLATION CHARTS

Contents

Start	3-3
Undetermined Problem	3-010-1
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System Board	3-100-1
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Math Coprocessor	3-700-1
Printer Adapter	3-900-1
Asynchronous Communications Adapter	3-1100-1
Alternate Asynchronous Communications Adapter	3-1200-1
Game Control Adapter	3-1300-1
Graphics Printer	3-1400-1
Synchronous Data Link Control Adapter ...	3-1500-1

Fixed Disk Drive	3-1700-1
Expansion Unit	3-1800-1
Binary Synchronous Communications Adapter	3-2000-1
Alternate Binary Synchronous Communications Adapter	3-2100-1
Cluster Adapter	3-2200-1
Compact Printer	3-3300-1

This is the entry point for all of the PICs. The PICs will help you determine which FRU is causing any of the following conditions:

- An error code
- An audio error during the POST
- A problem known to be related to one device
- An undetermined problem

To use the PICs you must have the following components:


- IBM Portable Personal Computer system unit
- Keyboard
- One diskette drive
- The Advanced Diagnostics diskette

Notes:

1. All voltages shown in the PICs are positive unless otherwise noted.
2. All voltage readings are taken with connectors plugged into their appropriate positions.

CONTINUE



- 
1. Ensure that all switch settings are correct (see Section 6).
 2. Ensure that all option locations have been met (see Section 4).
 3. Ensure the input voltage and input-voltage selector switch setting is correct (see Section 4).
-

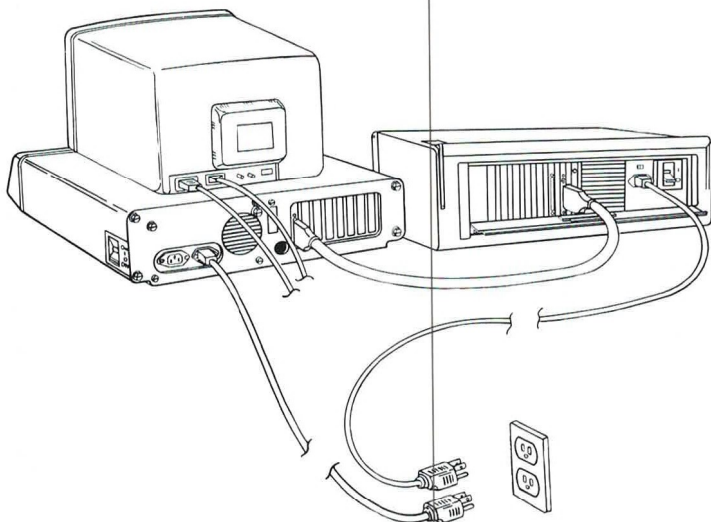
ARE THE OPTION LOCATIONS, INPUT VOLTAGE REQUIREMENTS, AND SWITCH SETTINGS CORRECT?

NO Correct the option locations, input voltages, and switch settings (see Section 4) for the option locations and input voltages and Section 6 for switch settings). Then continue with the next page.

YES



Ensure all connectors are installed securely and in their proper locations.



**ARE ALL CONNECTORS INSTALLED SECURELY
AND IN THEIR PROPER LOCATIONS?**

NO Install the connectors securely in their proper locations. Then continue with the next page.

YES

In the table below, find the error code that relates to your situation and go to the page indicated. For an undetermined problem or incorrect audio response, go to page 3-010-1.

Note: If the last two digits of an error code are zeros, the test was successful.

Problem Type	Error Code	PIC	Page
Audio Error Responses or Undetermined Problem		Undetermined Problem	3-010-1
	02X	Power	3-020-1
	1XX	System Board	3-100-1
	20X or XXXXX XX20X	Memory	3-200-1
Error Code or Problem Related To One Device	30X or XX30X	Keyboard	3-300-1
	4XX	Display (Monochrome)	3-400-1
	5XX	Display (Color/Graphics)	3-500-1
	6XX	Diskette Drive	3-600-1
	7XX	Math Coprocessor	3-700-1
	9XX	Printer Adapter	3-900-1
	11XX	Asynchronous Comm.	3-1100-1
	12XX	Alt. Asynchronous Comm.	3-1200-1
	13XX	Game Control Adapter	3-1300-1
	14XX	Printer	3-1400-1
	15XX	SDLC Comm. Adapter	3-1500-1
	17XX	Fixed Disk Drive	3-1700-1
	18XX	Expansion Unit	3-1800-1
	20XX	BSC Adapter	3-2000-1
	21XX	Alt. BSC Adapter	3-2100-1
	22XX	Cluster Adapter	3-2200-1
	XXXXX ROM	ROM Table	3-010-16
	29XX	Color Printer	*
	33XX	Compact Printer	3-3300-1

*Go to the Color Printer's Hardware Maintenance and Service Manual.

Go to the appropriate PIC.

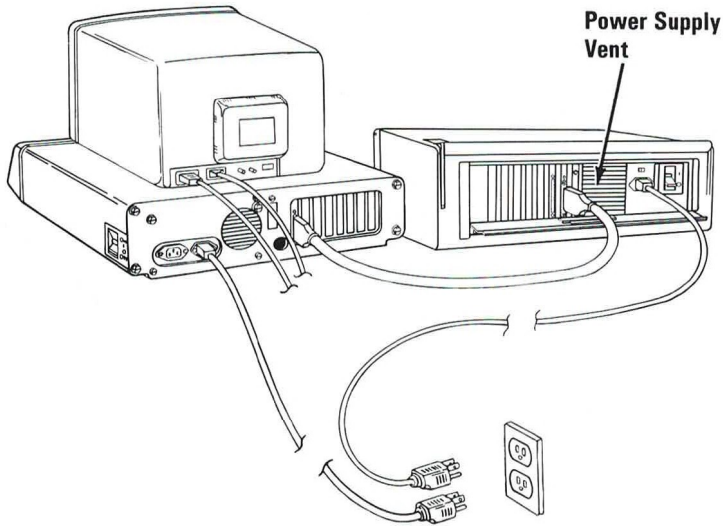
Undetermined Problem

1. Plug the system unit's power cord into a functioning wall outlet. If the expansion unit is attached, plug its power cord into a wall outlet.
2. Verify that the input voltages and the input-voltage selector switch setting is correct (see Section 4).
3. Remove any diskette(s) from the diskette drive(s).
4. Remove all non-IBM devices and modified options (prototype card).
5. If the expansion unit is attached, set its Power switch to On.
6. Set the system unit's Power switch to On.

CONTINUE

1. Determine if the power-supply fan is running by feeling for the exhaust from the power-supply vent as shown below.


Note: If the system unit (or expansion unit) is working properly but the power supply fan is not running, replace the power supply or the fan in the unit with the failing fan (see Section 5).



IS THE POWER SUPPLY FAN RUNNING?

- NO** Check the system unit's (or expansion unit's) power cord for continuity. If the power cord does not have continuity, replace it. If the power cord has continuity, go to page 3-020-1.

YES



When the IBM Portable Personal Computer Power switch is set to On, the normal responses are:

- While memory is being tested, the memory size appears in the top left corner of the screen and increases in 16K increments until all memory is tested.
- One short beep sounds when the POST is complete.
- The IBM Personal Computer BASIC screen appears, unless an operating system is loaded from a diskette drive or fixed disk drive.

When the Power switch is set to On, on a failing system, you may receive one or more of the following responses:

- A blank or incorrect screen
- An incorrect audio response
- An error message

If an error message appears with an audio error, disregard the audio error, and troubleshoot the problem indicated by the error message. If you receive several error messages, troubleshoot the problem indicated by the error message that appears first.

CONTINUED 

The X shown in the following chart represents any alphanumeric character.

Error Indication	PIC Title	Page
No display and no beep	Power	3-020-1
Continuous beep	Power	3-020-1
Repeating short beeps	Power	3-020-1
Incorrect memory size displayed	Memory	3-200-1
1 long and 2 short beeps	Display	3-500-1
2 short beeps and a blank or incorrect display	Display	3-500-1
1XX	System Board	3-100-1
XXXXX Parity Check	Memory	3-200-1
301 or XX301	Keyboard	3-300-1
601	Diskette	3-600-1
XXXXX XX 201	Memory	3-200-1
Keyboard not functional	Keyboard	3-300-1
Graphics problems	Graphics Printer	3-1400-1
1701	Fixed Disk Drive	3-1700-1
1801	Expansion Unit	3-1800-1
22XX	Cluster Adapter	3-2200-1
29XX	Color Printer	*
33XX	Compact Printer	3-3300-1

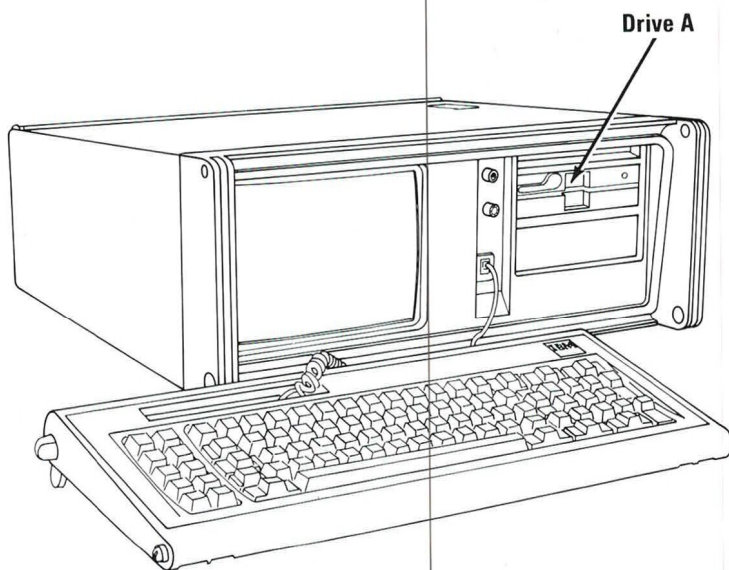
*Go to the Color Printer's Hardware Maintenance and Service Manual.

DO YOU HAVE AN ERROR INDICATION THAT MATCHES ONE FROM THE TABLE ABOVE?

YES Go to the page specified for your error indication.

NO

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Insert the Advanced Diagnostics diskette into diskette drive A.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Set the system unit's Power switch to On.
-



CONTINUE

Your screen should match the example shown below.

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version 2.XX (C) Copyright IBM Corp 1981, 1983

SELECT AN OPTION

- 0 – RUN DIAGNOSTIC ROUTINES
- 1 – FORMAT DISKETTE
- 2 – COPY DISKETTE
- 3 – PREPARE SYSTEM FOR RELOCATION
- 9 – EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? -  -

**DOES YOUR SCREEN MATCH THE EXAMPLE
SHOWN ABOVE?**

NO If you received an error code, make a note of it and go to page 3-6. If you did not receive an error code, go to page 3-010-14.

YES

1. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 2. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
-

THE INSTALLED DEVICES ARE

1 - S SYSTEM BOARD
18 - S EXPANSION OPTION
2 - S XXXKB MEMORY
3 - S KEYBOARD
4 - S MONOCHROME & PRINTER ADAPTER
6 - S X DISKETTE DRIVE(S) & ADAPTER
7 - S PRINTER ADAPTER
9 - S PRINTER ADAPTER
11 - S AYNC COMMUNICATIONS ADAPTER
12 - S ALT AYNC COMMUNICATIONS ADPT
13 - S GAME CONTROL ADAPTER
15 - S SKLC COMMUNICATIONS ADAPTER
17 - S X FIXED DISK DRIVE(S) & ADAPTER
20 - S BSC ADAPTER
21 - S ALT BSC ADAPTER
14 - S MATRIX PRINTER


IS THIS LIST CORRECT (Y/N)?



**DID THE INSTALLED DEVICES MENU APPEAR
ON YOUR SCREEN?**

NO Go to page 3-300-1, and follow the PIC.

YES 



Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on the screen to correct the list before answering yes. Then verify that the switch settings are correct (see Section 6).

The System Checkout menu appears.

SYSTEM CHECKOUT

- 0 – RUN TESTS ONE TIME**
- 1 – RUN TESTS MULTIPLE TIMES**
- 2 – LOG UTILITIES**
- 9 – EXIT DIAGNOSTIC ROUTINES**

ENTER THE ACTION DESIRED

? 

CONTINUE



1. Press 1 (**RUN TESTS MULTIPLE TIMES**), then press Enter. A menu similar to the one below appears on your screen.
 2. Press Enter to test all options.
 3. Follow the instructions on your screen to perform all tests.
-

THE INSTALLED DEVICES ARE

1 - S SYSTEM BOARD
18 - S EXPANSION OPTION
2 - S XXXKB MEMORY
3 - S KEYBOARD
4 - S MONOCHROME & PRINTER ADAPTER
6 - S X DISKETTE DRIVE(S) & ADAPTER
11 - S AYNC COMMUNICATIONS ADAPTER
17 - S X FIXED DISK DRIVE(S) & ADAPTER
14 - S MATRIX PRINTER
IS THIS LIST CORRECT (Y/N)? - ☼ -

DID YOU RECEIVE AN ERROR MESSAGE?

- YES** Make a note of the error message and go to the appropriate PIC indicated on page 3-6.
- NO** You have successfully completed the advanced diagnostics. If you suspect an intermittent problem, go to the next page.


Intermittent Problem

You are on this page because you completed the advanced diagnostics without finding an error and you suspect an intermittent problem. To log errors to diskette:

1. Copy your Advanced Diagnostics diskette to another diskette.
2. Remove the original Advanced Diagnostics diskette and insert the copy into diskette drive A.
3. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
4. If the expansion unit is attached, set its Power switch to On.
5. Set the system unit's Power switch to On.
6. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
7. Press Y or N (**IS LIST CORRECT (Y/N)?**), then press Enter.

CONTINUE




- 
1. Press 2 (**LOG UTILITIES**), then press Enter.
 2. Press 0 (**START ERROR LOG**), then press Enter.
 3. Press D (**LOG TO DISK, OR PRINTER (D C P)?**), then press Enter.

Note: If you plan to test the diskette drive(s), you must log the errors to a printer and have a blank formatted diskette available.

4. Press A (**ENTER THE DRIVE ID FOR ERROR LOG?**), then press Enter.
5. Press 9 (**RETURN FROM UTILITIES**), then press Enter.

CONTINUE



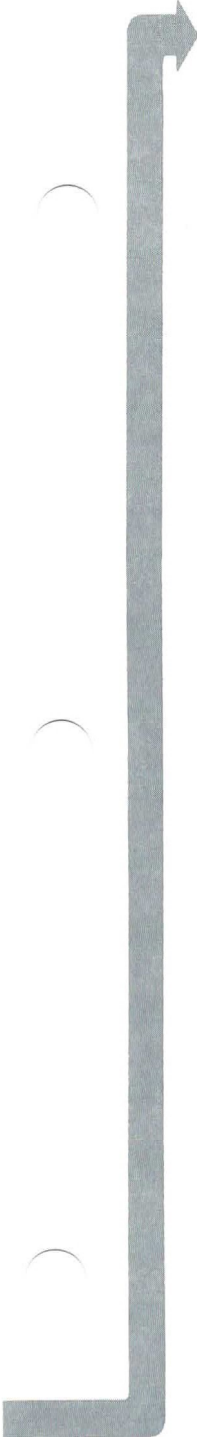
- 
1. Press 1 (**RUN TESTS MULTIPLE TIMES**), then press Enter.
 2. Select the device(s) that you suspect has a failure and press Enter.
 3. Press Enter (**ENTER NUMBER OF TIMES TO RUN TESTS OR PRESS ENTER TO RUN FOREVER**).
 4. Press N (**WAIT EACH TIME AN ERROR OCCURS (Y/N)?**), then press Enter.
 5. Follow any instructions on your screen and select all available tests.

The tests will begin to run continuously. Allow the tests to run several times.

6. To stop testing, hold down the Ctrl key then press the Break key.

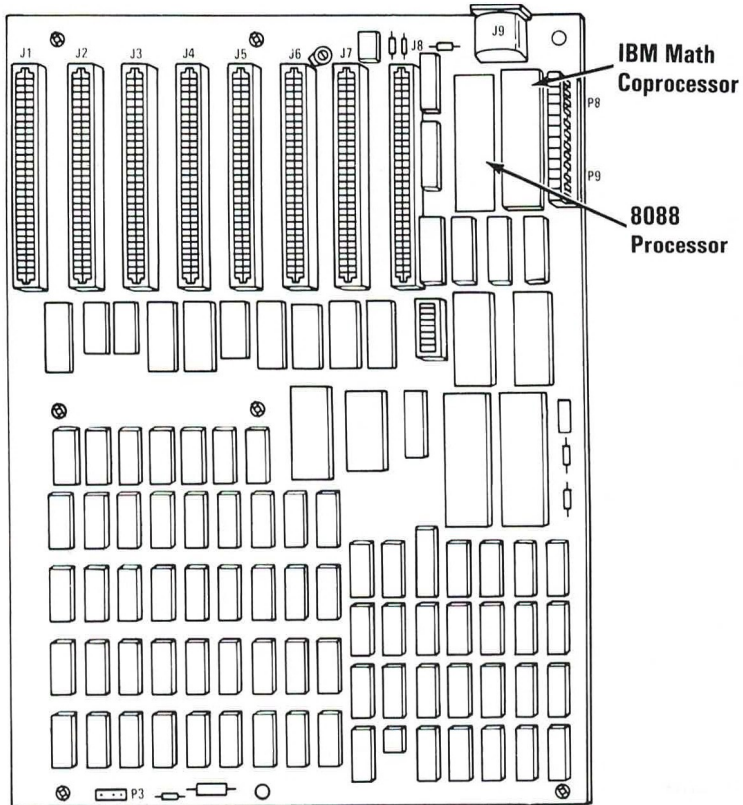
CONTINUE



- 
1. To list the error log, press Y or N (**IS LIST CORRECT (Y/N)?**), then press Enter.
 2. Press 2 (**LOG UTILITIES**), then press Enter.
 3. Press 2 (**LIST LOG**), then press Enter.
 4. Press D (**DISKETTE**), then press Enter.
 5. Press A (**ENTER THE DRIVE ID FOR ERROR LOG?**), then press Enter.
 6. The **LOG UTILITIES** menu is displayed if no errors occurred. If error messages are displayed, make a note of the error message and go to the appropriate PIC indicated on page 3-6.

Note: If you have followed these procedures and still have an unsolved problem, you should request technical assistance.

You may have a failing coprocessor.




**DO YOU HAVE A MATH COPROCESSOR
INSTALLED IN YOUR SYSTEM UNIT?**

NO Go to page 3-600-1.

YES



- 
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Remove the Math Coprocessor (see Section 5).
 3. Set switch 2 on the system board to the On position (see Section 6).
 4. Insert your Advanced Diagnostics diskette in drive A.
 5. If the expansion unit is attached, set its Power switch to On.
 6. Set the system unit's Power switch to On.
-

DID THE FAILURE SYMPTOM REMAIN?

- NO** Replace both the Math Coprocessor and the 8088 processor (see Section 5).
- YES** Reinstall your Math Coprocessor (see Section 5). Set switch 2 on the system board to Off (see Section 6). Go to page 3-600-1.

ROM Error Table

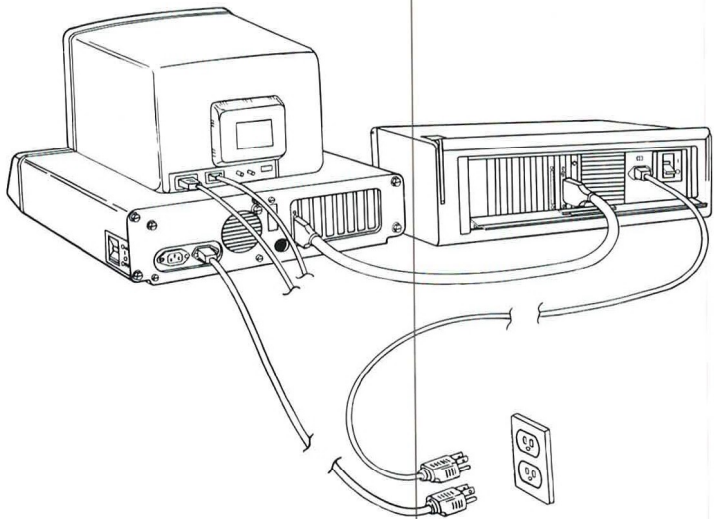
Match the ROM error code you received to the corrective action listed in the table below and take the corrective action.

Error Code	Corrective Action
F0000	Replace system board
F1000	Replace system board
F2000	Replace system board
F3000	Replace system board
F4000	Replace system board
F5000	Replace system board
F6000	Replace system board
F7000	Replace system board
F8000	Replace system board
F9000	Replace system board
FA000	Replace system board
FB000	Replace system board
FC000	Replace system board
C8000	Replace fixed disk adapter

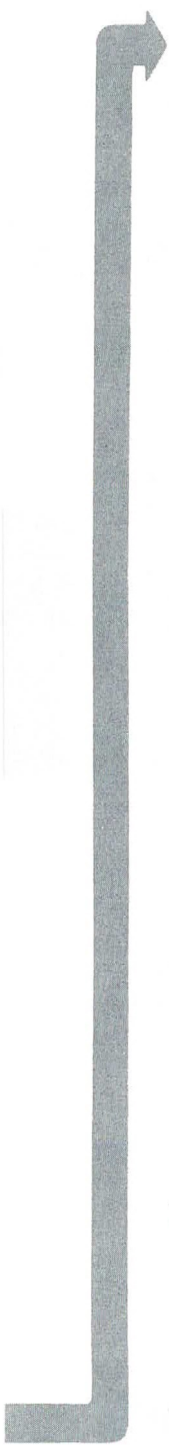
Power

You have entered this PIC because you were unable to complete the POST or have been directed here from another PIC. The input voltages, are assumed to be correct and you have a functioning wall outlet and power cord.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. If the expansion unit is attached, unplug its power cord from the wall outlet.
3. Unplug the system unit's power cord from the wall outlet.



CONTINUE

- 
1. Disconnect the keyboard and all external devices attached to option adapters (except the expansion unit).
 2. Plug the power cords into the wall outlet.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Set the system unit's Power switch to On.
-

DID THE FAILURE SYMPTOM REMAIN?


CAUTION

Set the Power switch on the system unit (and expansion unit, if attached) to Off before connecting each device.

- NO** (Read the following Caution statement before proceeding.) Connect the external devices to the system unit, one at a time, until the failure symptom returns. Repair or replace the device causing the failure.

YES



- 
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Connect the keyboard to the system unit.
 3. If an expansion unit is attached, disconnect its cable from the system unit.
 4. Set the system unit's Power switch to On. (If an 1801 error code appears at this time, disregard it. Press the F1 key to continue.)
-



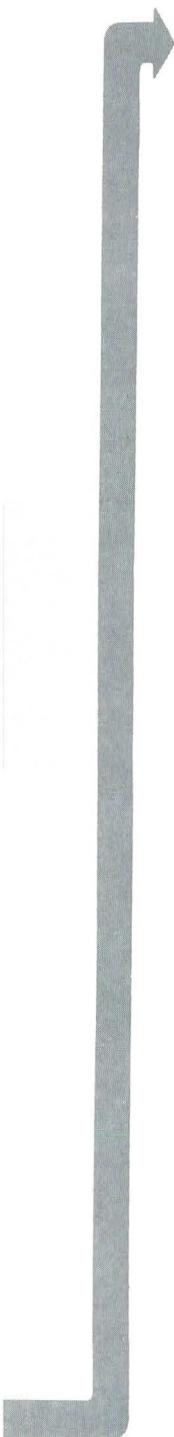
1801
XXX KB OK
ERROR. (RESUME = "F1" KEY)
- - - - -
- - - - -

Power

DID THE FAILURE SYMPTOM REMAIN?

NO Go to page 3-020-15

YES 



You may have a failing adapter. Follow the steps listed below.

1. Set the system unit's Power switch to Off.
2. Remove the cover from the system unit (see Section 5).
3. Remove one option adapter at a time from the system board (see Section 5). Do not remove the diskette adapter or the display adapter until all other adapters have been removed. Remove the display adapter last.
4. Set the system unit's Power switch to On.
5. Repeat Steps 1, 3, and 4 until you find the failing adapter or until all adapters have been removed.

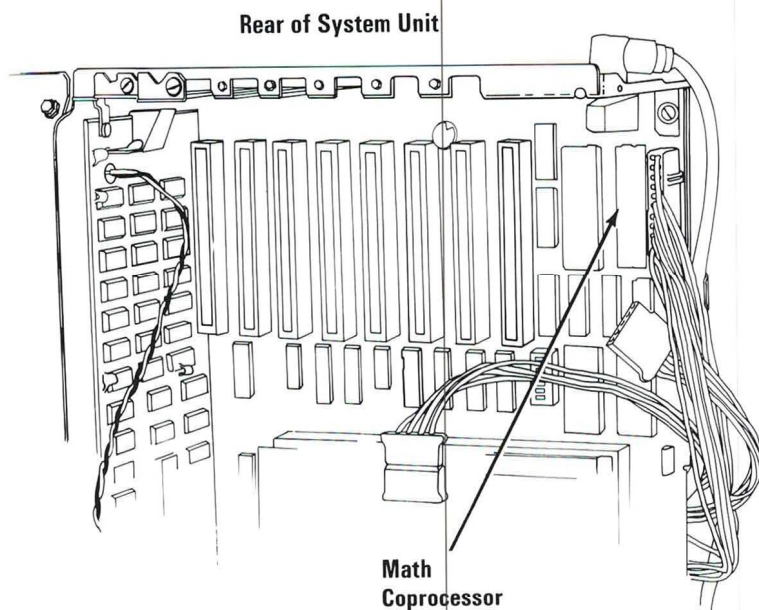
Note: Removal of the display adapter results in one long and two short beeps during the POST.

DID THE FAILING SYMPTOM REMAIN?

NO Replace the last adapter removed (see Section 5).

YES 

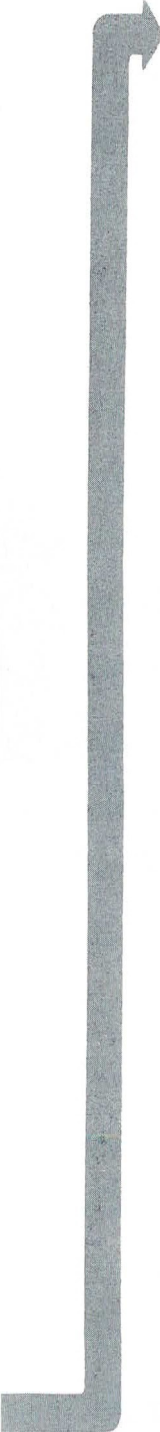
You may have a failing coprocessor.



**DO YOU HAVE A MATH COPROCESSOR
INSTALLED IN YOUR SYSTEM UNIT?**

NO Go to page 3-020-7.

YES

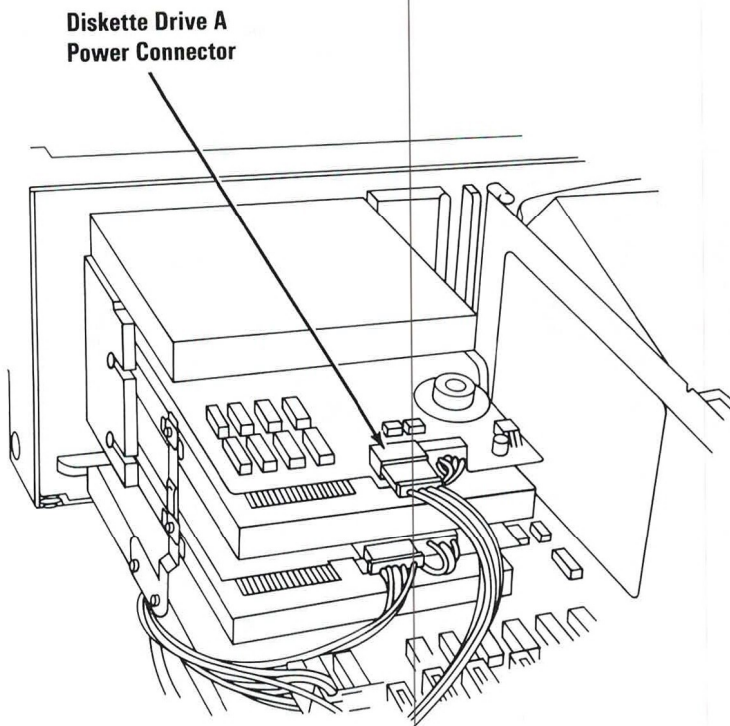
- 
1. Set the system unit's Power switch to Off.
 2. Remove the IBM Math Coprocessor from the system unit (see Section 5).
 3. Set the system unit's Power switch to On.
-

DID THE FAILURE SYMPTOM REMAIN?

NO Replace the IBM Math Coprocessor and the 8088 Processor (see Section 5).

YES 

1. Set the system unit's Power switch to Off.
 2. Disconnect the power connector from diskette drive A.
 3. Set the system unit's Power switch to On.
-



DID THE FAILURE SYMPTOM REMAIN?

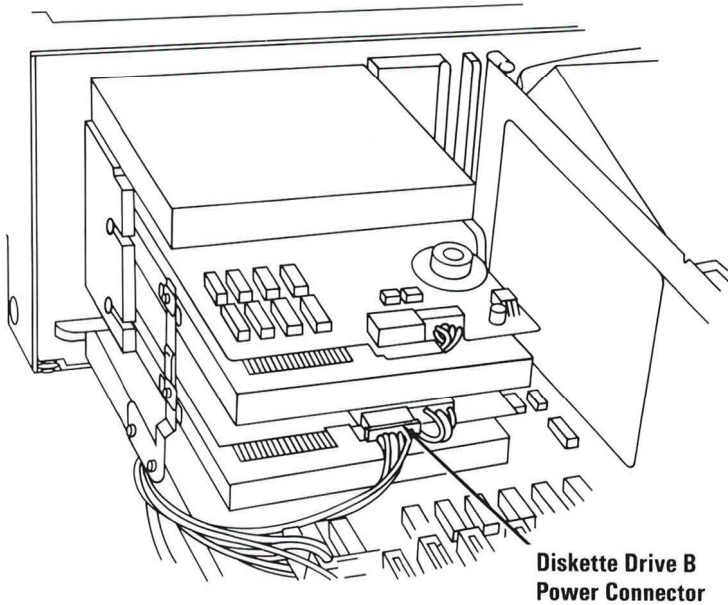
NO Replace diskette drive A (see Section 5).

YES



If you do not have a second diskette drive installed, go to the next page.

1. Set the system unit's Power switch to Off.
 2. Disconnect the power connector from diskette drive B. Leave diskette drive A disconnected.
 3. Set the system unit's Power switch to On.
-



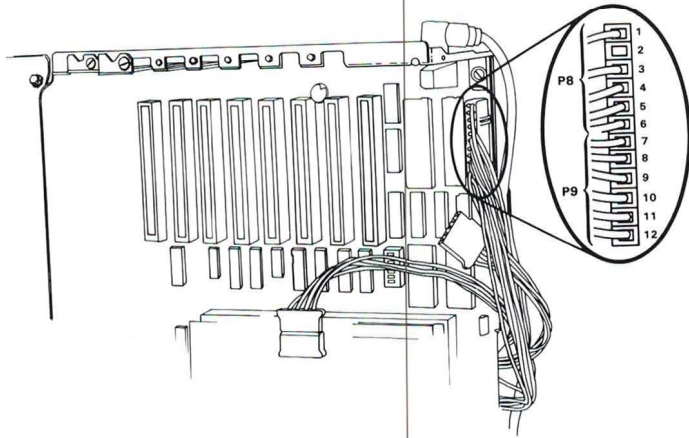
DID THE FAILURE SYMPTOM REMAIN?

NO Replace diskette drive B (see Section 5).

YES



1. Set the system unit's Power switch to Off.
2. Set your meter to the 12-Vdc scale. Connect the common lead to pin 5 of the system board's power connector and the voltage lead to pin 1.
3. Set the system unit's Power switch to On.
4. Check for a voltage reading of 2.4 to 5.2 Vdc.



Power

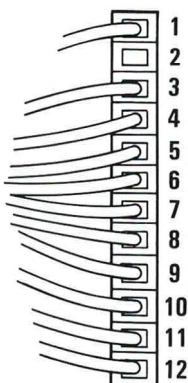
**DO YOU HAVE 2.4 TO 5.2 Vdc BETWEEN PIN 1
AND PIN 5?**

NO Go to page 3-020-14.

YES

Check the rest of the power-supply voltages to the system board:

1. Set your meter to the 12-Vdc scale.
2. Check the system board's power connectors for the voltages listed in the table below.



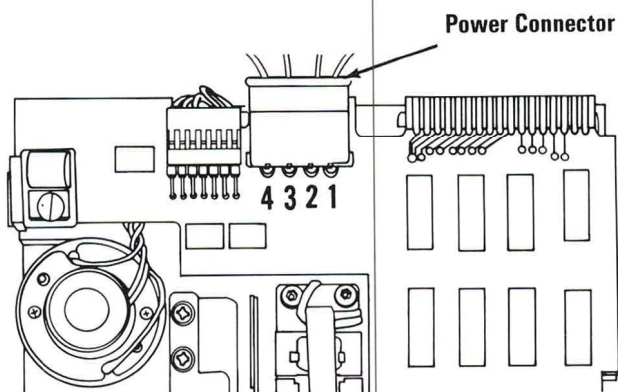
Voltage Connectors			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.25	5	10
+ 4.6	+ 5.5	9	6
+ 11.52	+ 12.6	7	3
+ 10.92	+ 13.2	4	8

**ARE THE SYSTEM-BOARD
POWER-CONNECTOR VOLTAGES CORRECT?**

NO Replace the power supply (see Section 5).

YES

1. Set the system unit's Power switch to Off.
2. Reconnect the power supply connector for diskette drive A.
3. Set the system unit's Power switch to On.
4. Check the diskette drive for the voltage readings shown in the table below.



Diskette Drive Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.25	3	4
+ 11.52	+ 12.6	2	1

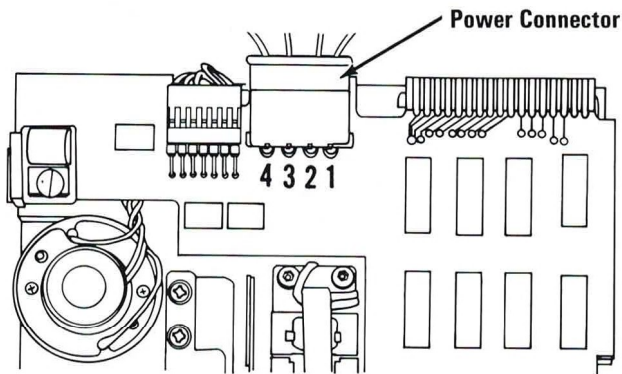
ARE THE VOLTAGES CORRECT?

NO Replace the power supply (see Section 5).

YES

If you do not have a second diskette drive installed, go to the next page.

1. Set the system unit's Power switch to Off.
2. Reconnect the power supply connector for diskette drive B.
3. Set the system unit's Power switch to On.
4. Check diskette drive B's power connector for the voltages shown in the table below.



Diskette Drive Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.25	3	4
+ 11.52	+ 12.6	2	1

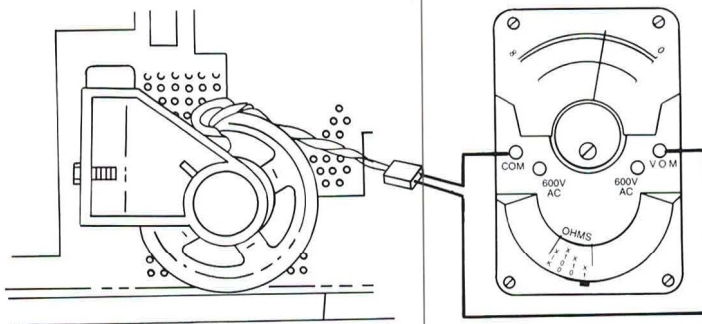
ARE THE VOLTAGES CORRECT?

NO Replace the power supply (see Section 5).

YES

Check the speaker circuit if you did not receive a beep after the POST.

1. Set the system unit's Power switch to Off.
2. Set your meter to the Ohms x 1 scale.
3. Disconnect the speaker cable from the system board (see Section 5).
4. See to the figure below and check the speaker connector for continuity.



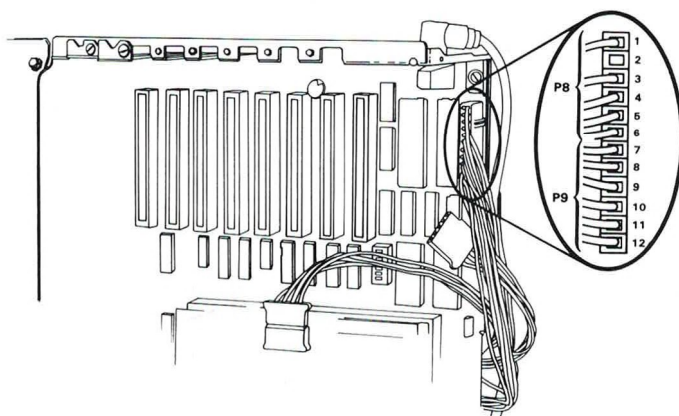
IS THERE CONTINUITY AT THE SPEAKER CONNECTOR?

NO Replace the speaker (see Section 5).

YES Replace the system board (see Section 5).

1. Set the system unit's Power switch to Off.
2. Set your meter to the Ohms x 1 scale.
3. Disconnect the system board's power connectors.
4. Remove all option adapters (see Section 5).
5. Refer to the figure below and measure the resistance as shown.

System Board Resistance Chart		
Min Resistance	COM Lead	VOM Lead
17 Ohms	5	3
17 Ohms	6	4
17 Ohms	7	9
8 Ohms	8	10
8 Ohms	8	11
8 Ohms	8	12



ARE ANY OF THE RESISTANCES BELOW THE MINIMUM INDICATED IN THE CHART?

NO Replace the power supply (see Section 5).

YES Replace the system board (see Section 5).


1. Set the system unit's Power switch to Off.
2. Connect the expansion unit's cable.
3. Insert the Advanced Diagnostics diskette in drive A.
4. Set the system unit's Power switch to On. Leave the expansion unit's Power switch Off.
5. When the 1801 error code appears, press the F1 key.
6. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
7. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
8. Press Y (**IS THE LIST CORRECT (Y/N)**), then press Enter.
9. Press 0 (**RUN TESTS ONE TIME**), then press Enter.

Power

CONTINUE




- 
1. Select 18 (**EXPANSION OPTION**), then press Enter.
-

TESTING – EXPANSION OPTION
X:XX:XX
ERROR – EXPANSION OPTION 1820 E
DATA – XXXX = XX/XX SW = X
PRESS ENTER TO CONTINUE
? 

DID YOU GET AN 1820 ERROR CODE?

NO Replace the extender card (see Section 5).

YES 

- 
1. Set the Power switch on the system unit and expansion unit to Off.
 2. Remove one option adapter (except the receiver card) from the expansion board.
 3. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On.
 4. Repeat Steps 1, 2, and 3 until you find the failing adapter or until all option adapters are removed.
-

DID THE FAILURE SYMPTOM REMAIN?

NO Replace the last adapter removed (see Section 5).

YES Replace the receiver card (see Section 5). If the failure symptom remains, replace the expansion board (see Section 5).

Notes:

System Board

You have entered this PIC because you have a **1XX** error code or have identified a system board failure.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Insert the Advanced Diagnostics diskette in drive A.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On.

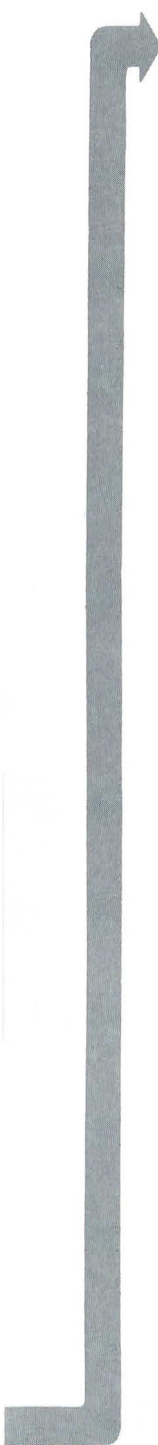
System Board

DID POST FINISH WITHOUT A **1XX ERROR MESSAGE?**

NO Replace the system board (see Section 5).

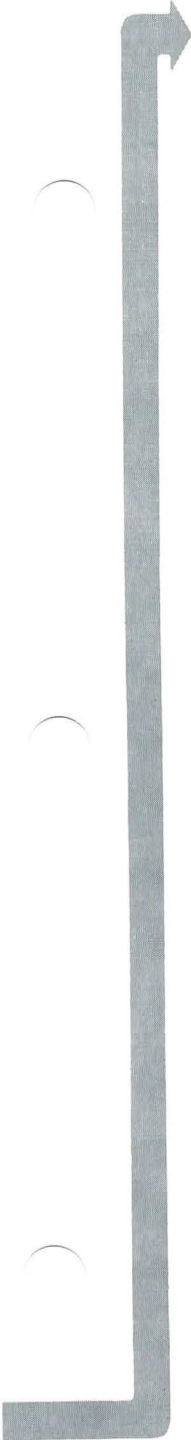
YES



- 
1. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 2. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 3. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is incorrect, follow the instructions on your screen to correct the list before answering yes.)
 4. Press 1 (**RUN TESTS MULTIPLE TIMES**), then press Enter.
 5. Press 1 (**SYSTEM BOARD**), then press Enter.
 6. Select the number of times to run the test, then press Enter. (Press only Enter to run the tests continuously.)
-

CONTINUE



- 
1. Press Y (**WAIT EACH TIME AN ERROR OCCURS (Y/N)?**), then press Enter.
-

TESTING – SYSTEM BOARD
SYSTEM BOARD 100 S

DID THE TEST FINISH WITHOUT A **1XX ERROR MESSAGE?**

- NO** If you received a **1XX** error message other than **199**, replace the system board (see Section 5).

Note: A **199** error message results from a "No" response to the options installation question (**IS THE LIST CORRECT (Y/N)?**). Do not replace the system board for a **199** error code. Go to page 3-010-1 and verify the installed devices.

- YES** You have successfully completed system-board diagnostics without an error indication. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Notes:

Memory

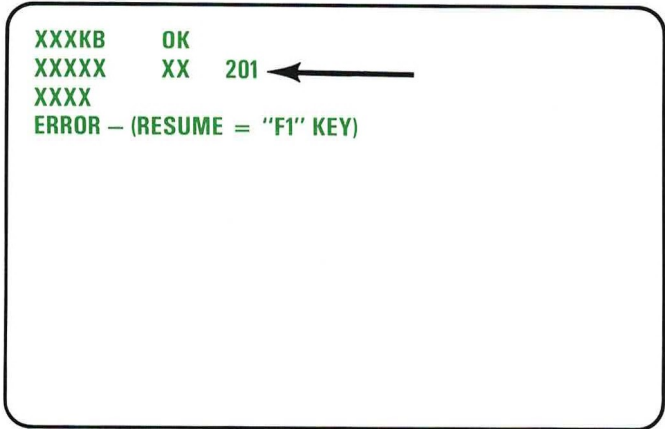
You have entered this PIC because you were unable to complete the POST, the memory size shown in the upper left corner of your screen was incorrect, a memory parity check occurred, or you have an error message indicating a memory failure.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Insert the Advanced Diagnostics diskette in drive A.
 3. Set the expansion unit (if attached), and the system unit's Power switch to On.
-

CONTINUE



You may receive an error code similar to the one shown in the example below. If you do, make a note of the seven-character error code (indicated by the arrow in the example).



```
XXXXB   OK
XXXXX   XX  201 ←
XXXX
ERROR - (RESUME = "F1" KEY)
```

**DID YOU RECEIVE AN ERROR MESSAGE
SIMILAR TO THE ONE SHOWN ABOVE?**

YES Make a note of the error code and go to page
 3-200-6.

NO



Your Advanced Diagnostics diskette should be loaded and the Option Selection menu displayed.

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version 2.XX (C) Copyright IBM Corp 1981, 1983

SELECT AN OPTION

- 0 – RUN DIAGNOSTIC ROUTINES
- 1 – FORMAT DISKETTE
- 2 – COPY DISKETTE
- 3 – PREPARE SYSTEM FOR RELOCATION
- 9 – EXIT TO SYSTEM DISKETTE

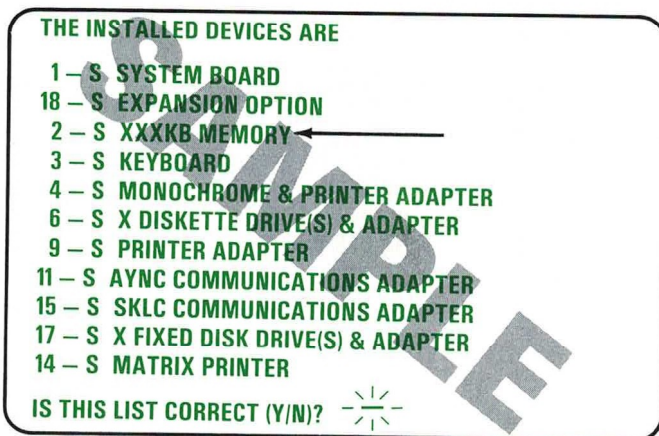
ENTER THE ACTION DESIRED ? - - - - -

**DID THE ABOVE MENU APPEAR ON YOUR
SCREEN?**

NO Go to page 3-020-1.

YES 


1. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
2. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
3. The Installed Devices menu should be displayed. Check the amount of memory shown on your screen (indicated by the arrow in the example below).



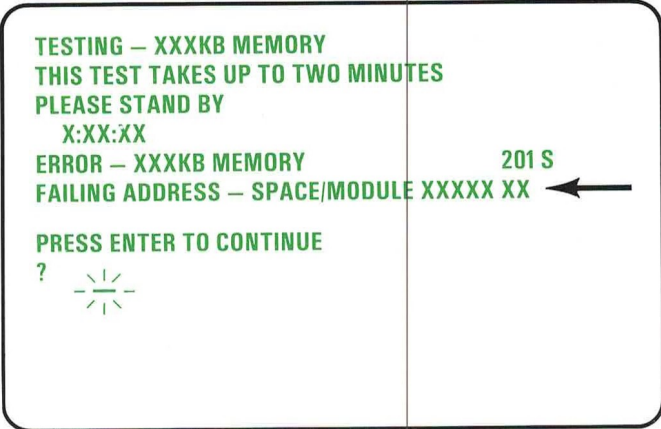
**DOES THE AMOUNT OF MEMORY LISTED
MATCH THE AMOUNT OF MEMORY IN THE
SYSTEM UNIT?**

NO Go to page 3-200-15.

YES

- 
1. Press Y or N (**IS THE LIST CORRECT**), then press Enter. (If the list is incorrect, follow the instructions on the screen to correct the list before answering yes.)
 2. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
 3. Press 2 (**XXXXKB MEMORY**), then press Enter.

If you receive an error message similar to the one shown in the example below, make a note of the seven-character error code (indicated by the arrow).



TESTING - XXXKB MEMORY
THIS TEST TAKES UP TO TWO MINUTES
PLEASE STAND BY
X:XX:XX
ERROR - XXXKB MEMORY
Failing address - SPACE/MODULE XXXXX XX 201 S
PRESS ENTER TO CONTINUE
?

**DID YOU RECEIVE AN ERROR MESSAGE
SIMILAR TO THE EXAMPLE SHOWN ABOVE?**

NO Go to page 3-200-17.

YES 

Refer to the error code you just noted.

TESTING – XXXKB MEMORY
THIS TEST TAKES UP TO TWO MINUTES
PLEASE STANDY BY
X:XX:XX
ERROR – XXXKB MEMORY 201 S
FAILING ADDRESS – SPACE/MODULE XXXXX XX

PRESS ENTER TO CONTINUE



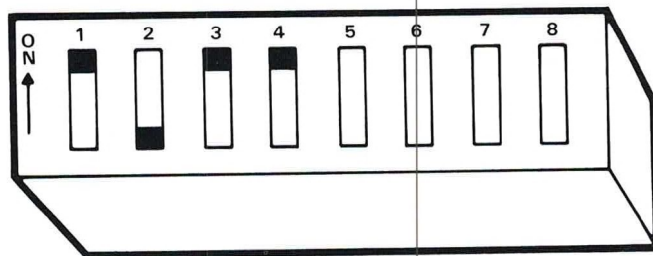
**WAS THE FIRST CHARACTER OF THE
SEVEN-CHARACTER CODE A 0, 1, 2, OR 3?**

YES Go to page 3-200-21.

NO

The failure is on the 64/256KB Memory Expansion Option.

Compare the switch settings shown below with those on the 64/256KB Memory Expansion Option in your system.



DO THE SWITCH SETTINGS ON YOUR 64/256KB MEMORY EXPANSION OPTION MATCH THOSE SHOWN ABOVE?

NO Go to Section 6 and compare your switch settings with those in the switch-setting charts. Make the necessary corrections, then go to page 3-200-1 and follow the PIC.

YES

When the sixth and seventh characters of the error code are 00, 01, 02, 04, 08, 10, 20, 40, or 80, the failure is one of the pluggable 64K memory modules.

TESTING – XXXKB MEMORY
THIS TEST TAKES UP TO TWO MINUTES
PLEASE STAND BY
X:XX:XX
ERROR – XXXKB MEMORY 201 S
FAILING ADDRESS – SPACE/MODULE XXXXX XX
PRESS ENTER TO CONTINUE
? 

**ARE THE SIXTH AND SEVENTH CHARACTERS
OF THE ERROR CODE 00, 01, 02, 04, 08, 10, 20, 40,
OR 80?**

- NO** Replace the 64/256KB Memory Expansion Option. Remove all the 64K modules from the failing option and install them on the new option (see Section 5). After replacing the 64/256KB Memory Expansion Option, go to page 3-200-1 and follow the PIC.

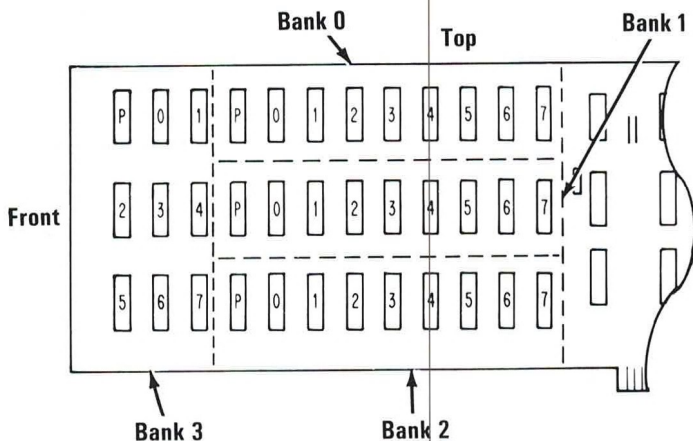
YES




The first character of your error code identifies the bank that has the failing module. The sixth and seventh characters identify the failing bit (module). For example, error code **70000 08 201** corresponds to a failing module in bank 3, module 3.

Refer to the table below to identify the failing bank and bit (module), then replace the module (see Section 5).

First Character of Error Code	4 or 8	5 or 9	6	7
Bank	Bank 0	Bank 1	Bank 2	Bank 3
Sixth and Seventh Characters of Error Code	00 01	02 04 08 10	20 40 80	
Bit	P 0	1 2 3 4	5 6 7	



CONTINUE

- 
1. Go to page 3-200-1 and perform the diagnostic tests to check memory and then, return to this page.
-

TESTING – XXXKB MEMORY
THIS TEST TAKES UP TO TWO MINUTES
PLEASE STAND BY
X:XX:XX
ERROR – XXXKB MEMORY 201 S
FAILING ADDRESS – SPACE/MODULE XXXXX XX
PRESS ENTER TO CONTINUE
? 

**DID YOU RECEIVE A MEMORY ERROR
MESSAGE?**

NO Your system memory is functioning correctly.

YES 

Compare this error code with the one you noted on page 3-200-5. Disregard the second character in both codes.

TESTING – XXXKB MEMORY
THIS TEST TAKES UP TO TWO MINUTES
PLEASE STAND BY
X:XX:XX
ERROR – XXXKB MEMORY 201 S
FAILING ADDRESS – SPACE/MODULE XXXXX XX
PRESS ENTER TO CONTINUE
? 

**ARE THE FIRST, SIXTH, AND SEVENTH
CHARACTERS OF THE NEW ERROR CODE
IDENTICAL TO THOSE OF THE PREVIOUS
ERROR CODE?**

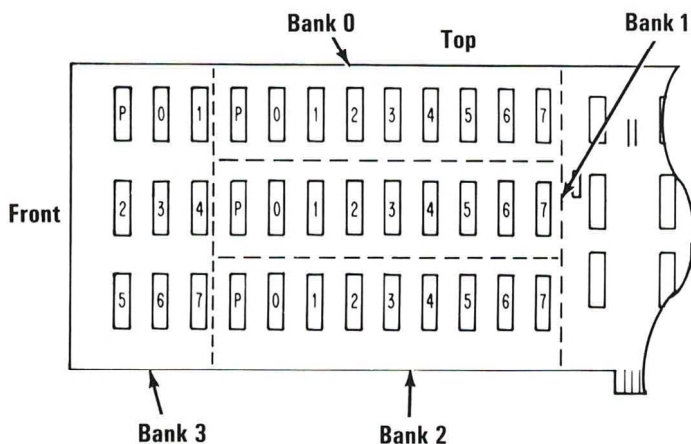
NO The memory has another failure. Make a note of the new error code. Go to page 3-200-6 and follow the PIC.

YES



The 64/256KB Memory Expansion Option still has a failing module, and the first character of the error code is not correctly identifying the failing bank. The sixth and seventh characters correctly identify the failing bit (module).

1. Replace the module in one of the banks that has not yet had a module replaced.
2. Go to page 3-200-1 and perform the diagnostic tests to check memory. After the diagnostics are completed, return to this page and answer the question below.



Sixth and Seventh									
Characters of Error Code	00	01	02	04	08	10	20	40	80
Bit	P	0	1	2	3	4	5	6	7

DID YOU RECEIVE A 200 S MESSAGE?

YES Your system memory is now functioning correctly.

NO

Compare this error code with the one you noted when you performed the diagnostic tests on page 3-200-5. Disregard the second character in both codes.

TESTING – XXXKB MEMORY
THIS TEST TAKES UP TO TWO MINUTES
PLEASE STAND BY
X:XX:XX
ERROR – XXXKB MEMORY 201 S
FAILING ADDRESS – SPACE/MODULE XXXXX XX
PRESS ENTER TO CONTINUE
? 

**ARE THE FIRST, SIXTH, AND SEVENTH
CHARACTERS OF THE NEW ERROR CODE
IDENTICAL TO THOSE OF THE PREVIOUS
ERROR CODE?**

NO The memory has another failure. Make a note of the new error code. Go to page 3-200-6 and follow the PIC.

YES 

The failing module may be in one of the other banks that has not yet had a module replaced.

TESTING – XXXKB MEMORY
THIS TEST TAKES UP TO TWO MINUTES
PLEASE STAND BY
X:XX:XX
ERROR – XXXKB MEMORY 201 S
FAILING ADDRESS – SPACE/MODULE XXXXX XX
PRESS ENTER TO CONTINUE
? 

**HAVE YOU REPLACED THE FAILING MODULE
IN EACH OF THE FOUR BANKS?**

NO Go to page 3-200-12.

YES Replace the 64/256KB Memory Expansion Option. Remove all 64K modules from the failing option and install them on the new option (see Section 5). After replacing the 64/256KB Memory Expansion Option, go to page 3-200-1 and follow the PIC.

Go to Section 6 and compare your switch settings with those in the charts, then return to this page.

- THE INSTALLED DEVICES ARE
- 1 – S SYSTEM BOARD

18 – S EXPANSION OPTION

2 – S XXXKB MEMORY ←

3 – S KEYBOARD

4 – S MONOCHROME & PRINTER ADAPTER

6 – S X DISKETTE DRIVE(S) & ADAPTER

9 – S PRINTER ADAPTER

11 – S AYNC COMMUNICATIONS ADAPTER

13 – S GAME CONTROL ADAPTER

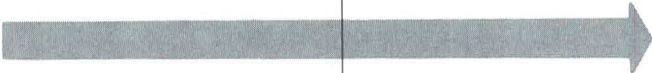
17 – S X FIXED DISK DRIVE(S) & ADAPTER


14 – S MATRIX PRINTER
- IS THIS LIST CORRECT (Y/N)? 

ARE THE SWITCH SETTINGS CORRECT FOR THE AMOUNT OF MEMORY INSTALLED IN YOUR SYSTEM?

NO Correct the switch settings, then go to page 3-200-1 and follow the PIC.

YES



- 
1. The amount of memory shown on your screen does not match the amount of memory installed in your system, but the switches are set correctly. Press N (**IS THE LIST CORRECT (Y/N)?**), then press Enter.
 2. Follow the instructions on your screen to correct the amount of memory shown on the Installed Devices menu.
-

THE INSTALLED DEVICES ARE

1 - S SYSTEM BOARD
2 - S XXXKB MEMORY
3 - S KEYBOARD
4 - S MONOCHROME & PRINTER ADAPTER
5 - S COLOR/GRAPHICS ADAPTER
6 - S X DISKETTE DRIVE(S) & ADAPTER
14 - S MATRIX PRINTER

IS THIS LIST CORRECT (Y/N)? n

X:XX:XX

ERROR - INSTALLED DEVICES LIST


199 S

ENTER (A) TO ADD ITEMS

OR ENTER (D) TO DELETE ITEMS

? - - - - -
- - - - -
- - - - -

After correcting the amount of memory, go to page 3-200-1 and follow the PIC.



You should be on this page because the memory test finished without returning a seven-character error message.

You may have a parity-check message.


PARITY CHECK X
XXXXX

**DID YOU ENTER THIS PIC BECAUSE YOU HAD A
PARITY CHECK?**

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

YES





After a parity check, the memory is scanned to see if a failing address can be identified. If identified, the address is displayed as a five-character, alphanumeric code under the parity check message. If the failing address cannot be identified, five question marks are displayed under the parity check message.



PARITY CHECK X
XXXXX

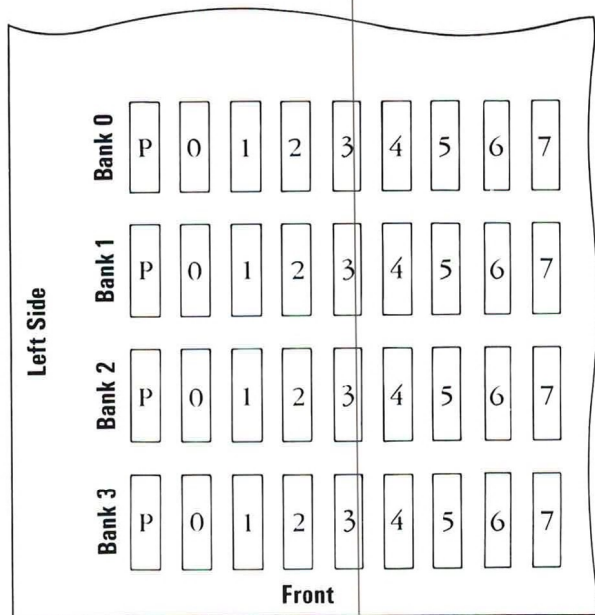
DO YOU HAVE A PARITY CHECK ERROR CODE?

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

YES 

The first character of the five-character error code identifies the failing bank. For example, error code **2C000** means that bank 2 is failing.

First Character of Error Code	0	1	2	3
Bank	Bank 0	Bank 1	Bank 2	Bank 3

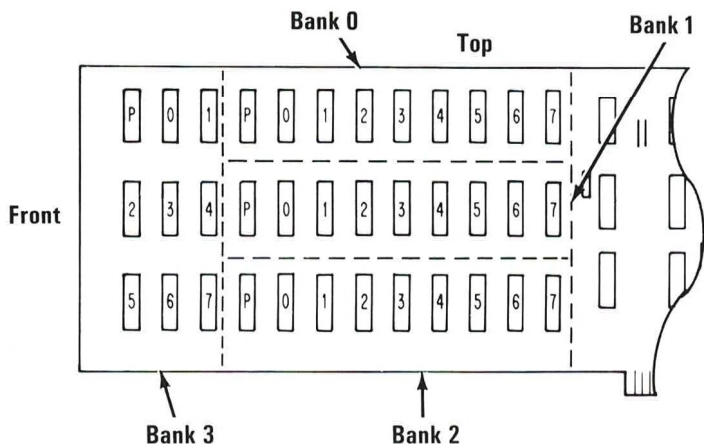


IS THE FIRST CHARACTER OF THE ERROR CODE A **0**, **1**, **2**, OR **3**?

YES Replace the nine modules in the failing bank of the system board, then go to page 3-200-1 and follow the PIC.

NO

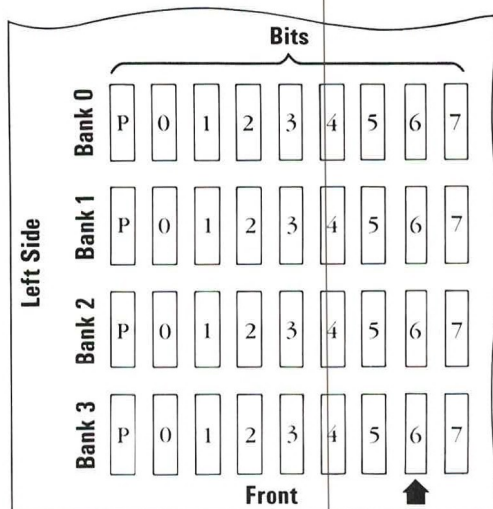
1. The 64/256KB Memory Expansion Option is failing. Use the first character of the parity error code and the chart below to determine the failing bank. For example, error code **6C000** means that bank 2 is failing.
2. Replace the nine modules in the failing bank, then go to page 3-200-1 and follow the PIC.



First Character of Error Code	4 or 8	5 or 9	6	7
Bank	Bank 0	Bank 1	Bank 2	Bank 3

A memory failure displays the failing address in the form of a seven-character alphanumeric code, followed by 201. If the first character of the seven-character code is a 0, 1, 2, or 3, you have a system board memory failure, that the character indicates which bank has the failing module. The sixth and seventh characters indicate which bit (module) of the bank failed (P, 0, 1, 2, 3, 4, 5, 6, or 7). For example, error code **3C000 40 201** corresponds to the failing module indicated by the arrow (bank 3, module 6).

Determine which module is failing.



First Character of

Error Code	0	1	2	3
Bank	Bank 0	Bank 1	Bank 2	Bank 3

Sixth and Seventh

Characters of Error Code	00	01	02	04	08	10	20	40	80
Bit	P	0	1	2	3	4	5	6	7

Memory

Replace the failing module, then go to page 3-200-1 and follow the PIC to verify the problem is corrected.

Notes:

Keyboard

You have entered this PIC because you have a **3XX** error or have identified a keyboard problem.

If your keyboard has visibly broken parts, see Section 5. If not, continue.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Insert the Advanced Diagnostics diskette in drive A.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On.
5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
6. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is incorrect, follow the instructions on the screen to correct the list before answering yes.)
7. Select 0 (**RUN TESTS ONE TIME**), then press Enter.

If you have a **3XX** error code or a non-functioning keyboard, go to page 3-300-3.

CONTINUE



1. Select 3 (**KEYBOARD**), then press Enter.
 2. Follow the instructions on your screen, which should look like the example below. If any key is not working properly, press N then press Enter.
-



PRESS EACH KEY, HOLD FOR TYPOMATIC TEST
IF OK PRESS "Y ENTER"
IF NOT OK PRESS "N ENTER"



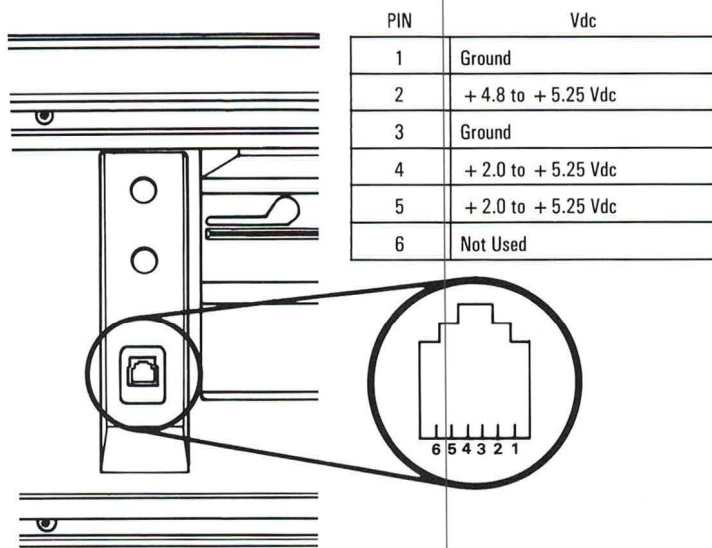
**AFTER PERFORMING THE TEST AND
ANSWERING THE QUESTION DISPLAYED ON
THE SCREEN, DO YOU HAVE A **3XX** ERROR
CODE?**

NO Your keyboard has successfully passed the diagnostics. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

YES



1. Set the Power switch on the system unit (and the expansion unit, if attached) to Off.
2. Remove the keyboard connector from the front of the system unit.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On.
5. Check the keyboard connector at the front of the system unit for the appropriate voltages, as shown in the figure below.

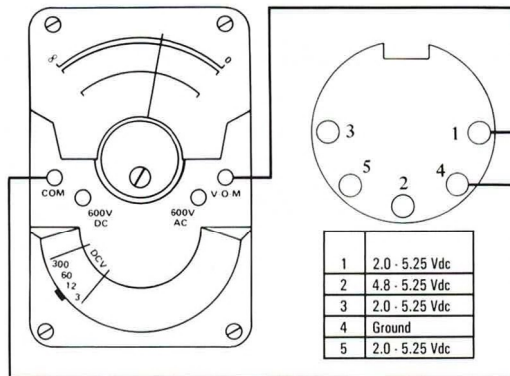


ARE ALL THE VOLTAGES CORRECT?

YES If the keyboard cable is visibly damaged, replace it; otherwise, replace the keyboard and cable (see Section 5).

NO

1. Set the Power switch on the system unit (and the expansion unit, if attached) to Off.
2. Remove the internal keyboard connector from the rear of the system unit.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On.
5. Check the system board's keyboard connector at the rear of the system unit for the appropriate voltages, as shown in the figure below.



ARE ALL THE VOLTAGES CORRECT?

YES Replace the internal keyboard cable (see Section 5).

NO Replace the system board (see Section 5).

Display

You have entered this PIC because you have a **50X** error code or have identified a display problem.

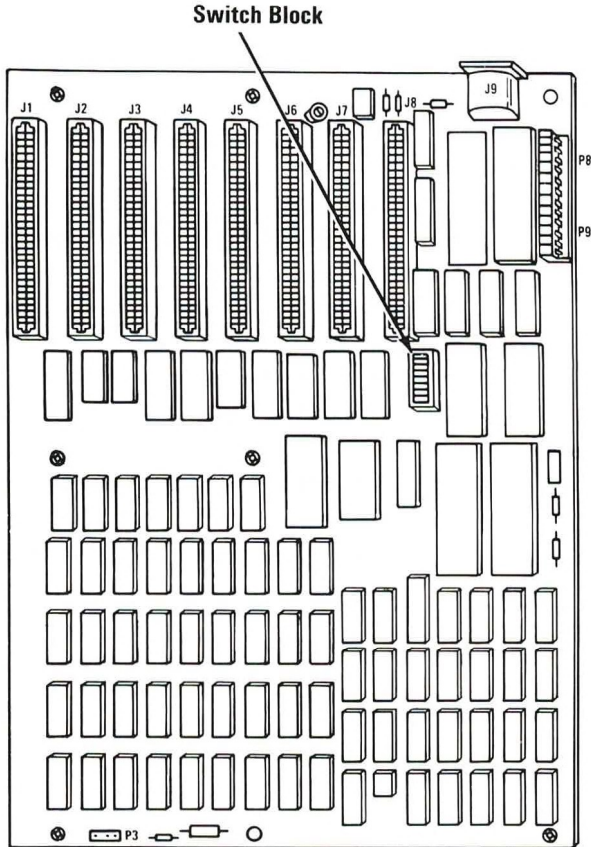
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Disconnect all cables, devices, and wrap plugs from the Asynchronous Communications Adapter and the Alternate Asynchronous Communications Adapter (if installed).
3. Insert the Advanced Diagnostics diskette into drive A.
4. If the expansion unit is attached, set its Power switch to On.
5. Set the system unit's Power switch to On.
6. If your display has a separate power switch, set it to On.
7. Turn the Brightness and Contrast controls clockwise.
8. Note any audio responses during the POST.

**DID YOU RECEIVE AN AUDIO ERROR
INDICATION OF ONE LONG AND TWO SHORT
BEEPS?**

NO Go to page 3-500-3.

YES 

Go to Section 6, "Switch Settings," and compare your switch settings with those in the charts, then return to this page.



ARE THE SWITCH SETTINGS CORRECT?

- NO** Correct the switch settings and verify that the system is operating correctly.
- YES** Replace the Color/Graphics Monitor Adapter (see Section 5).

The Option Selection menu should be on your screen.


Display

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version 2.XX (C) Copyright IBM Corp 1981, 1983

SELECT AN OPTION

- 0 - RUN DIAGNOSTIC ROUTINES
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR RELOCATION
- 9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? 

IS THE SCREEN DARK (NO ILLUMINATION)?

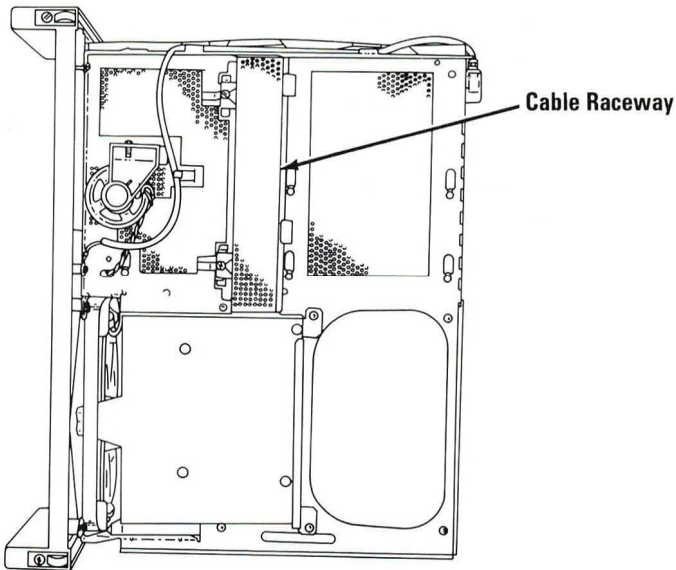
NO Go to page 3-500-6.

YES



If the IBM Portable Personal Computer display is working properly and you are here because of a problem with an external display, go to page 3-500-23; otherwise, continue.

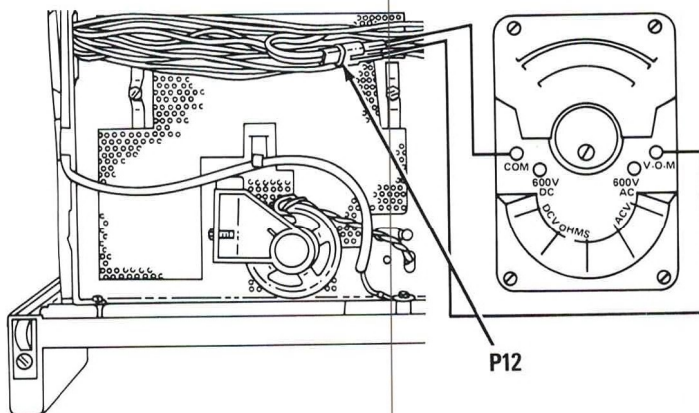
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Remove the system-unit cover and shield from the IBM Portable Personal Computer (see Section 5).
3. Carefully set the system unit on its side, as shown in the example below.
4. Remove the cable raceway.



CONTINUE

1. Reconnect all cables and power cords removed during the cover removal.
2. If the expansion unit is attached, set its Power switch to On.
3. Set the system unit's Power switch to On.
4. Measure the voltage at the display's power connector, P12, for 11.88 to 12.12 Vdc, as shown in the figure below.

Note: Do not unplug connector P12.



DID THE VOLTAGE AT P12 MEASURE BETWEEN 11.88 AND 12.12 VDC?

NO Replace the power supply (see Section 5).

YES Go to page 3-500-23.

1. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 2. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 3. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 4. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
-

CONTINUE



Press 5 (COLOR/GRAPHICS MONITOR ADAPTER) then press Enter.

Display

COLOR/GRAPHICS MONITOR ADAPTER TEST

- 0 — DISPLAY ADAPTER TEST
- 1 — DISPLAY ATTRIBUTES
- 2 — CHARACTER SET
- 3 — 80X25 DISPLAY
- 4 — 40X25 DISPLAY
- 5 — 320X200 GRAPHICS
- 6 — 640X200 GRAPHICS
- 7 — LIGHT PEN TEST
- 8 — SCREEN PAGING
- 9 — EXIT TO MAIN MENU
- 10 — RUN ALL ABOVE TESTS
- 11 — VIDEO TEST
- 12 — SYNC TEST

ENTER NUMBER OF DESIRED ACTION



IS THE ABOVE MENU STEADY AND READABLE ON YOUR DISPLAY?

- NO** If the failing display is not an IBM Color Display, go to page 3-500-23. If the display is an IBM Color Display, see Section 5 and adjust the vertical hold. If you have already made this adjustment and the screen presentation on your display is not steady and readable, go to page 3-500-23.

YES

Your display may function correctly except that the cursor is out of its normal position or is missing.

COLOR/GRAPHICS MONITOR ADAPTER TEST

- 0 — DISPLAY ADAPTER TEST
- 1 — DISPLAY ATTRIBUTES
- 2 — CHARACTER SET
- 3 — 80X25 DISPLAY
- 4 — 40X25 DISPLAY
- 5 — 320X200 GRAPHICS
- 6 — 640X200 GRAPHICS
- 7 — LIGHT PEN TEST
- 8 — SCREEN PAGING
- 9 — EXIT TO MAIN MENU
- 10 — RUN ALL ABOVE TESTS
- 11 — VIDEO TEST
- 12 — SYNC TEST

ENTER NUMBER OF DESIRED ACTION

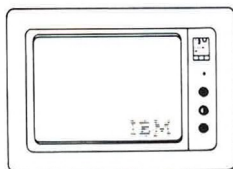


IS THE CURSOR VISIBLE AND IN THE CORRECT POSITION ON YOUR DISPLAY?

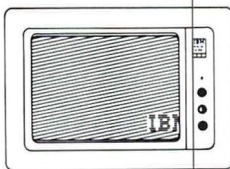
NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

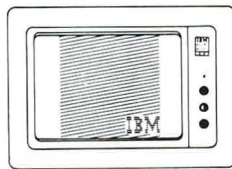
Your screen presentation may be distorted, or the characters may be the wrong size, as shown in the example below. If you have an IBM Color Display and the characters are not the correct size, see Section 5 and do the vertical size adjustment before answering the question below.



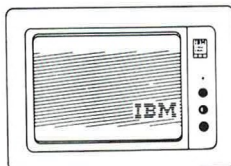
Too Dim



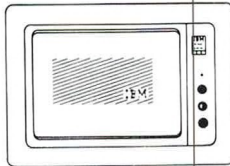
Too Wide



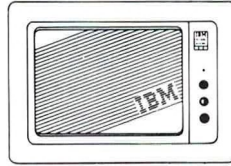
Too Narrow



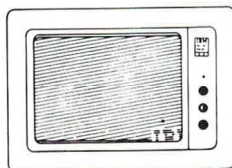
Too Short



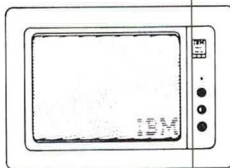
Shrunk



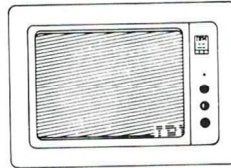
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus



**Characters Shifted Left
or Right, or Up or Down,
Off the Display Area**

**IS YOUR SYMPTOM DIFFERENT FROM THE
EXAMPLES SHOWN ABOVE?**

NO Replace the display (see Section 5).

YES

Select 10 (RUN ALL ABOVE TESTS), then press Enter.

DISPLAY ATTRIBUTES
THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.
THIS LINE IS BLINKING.

 BLUE
 GREEN
 CYAN
 RED
 MAGNETA
 YELLOW
 WHITE

IS THE SCREEN CORRECT? (Y/N) 

DID THE TESTS RUN WITHOUT A 501 ERROR CODE?

NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

YES 

If you wish to test an IBM Portable Personal Computer display, IBM Color Display, or any direct-drive monitor, go to the next page.

Composite color displays may be limited to two color shades, with the darker shade on top.

Display

DISPLAY ATTRIBUTES
THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.
THIS LINE IS BLINKING.

 BLUE
 GREEN
 CYAN
 RED
 MAGNETA
 YELLOW
 WHITE

IS THE SCREEN CORRECT? (Y/N)



ARE ALL THE COLORS PRESENT AND THE CORRECT SHADE?

NO If you have a composite color monitor, see Section 5 and adjust the color trimmer capacitor. Then return to this page. If you have already made this adjustment, go to page 3-500-23.

YES

If you do not have an IBM Color Display, go to the next page.

Adjust the Brightness and Contrast controls until the intensified line is brighter than the other lines.

DISPLAY ATTRIBUTES
THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.
THIS LINE IS BLINKING.

 BLUE
 GREEN
 CYAN
 RED
 MAGNETA
 YELLOW
 WHITE

IS THE SCREEN CORRECT? (Y/N) 

**WERE YOU ABLE TO ADJUST FOR AN
INTENSIFIED LINE?**

NO Go to page 3-500-23.

YES 

The IBM Portable Personal Computer display does not support the color portion of this diagnostic menu. On composite color monitors, the colors appear in two shades, with the darker shade on top. Direct-drive monitors may not support the intensified line.

The appearance of each line on the display should match the description in that same line, with the exceptions noted above.

Display

DISPLAY ATTRIBUTES
THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.
THIS LINE IS BLINKING.



BLUE



GREEN



CYAN



RED



MAGNETA



YELLOW



WHITE

IS THE SCREEN CORRECT? (Y/N)



DO THE LINES MATCH THEIR DESCRIPTIONS?

NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

YES



NO

Press Y (IS THE SCREEN CORRECT? (Y/N)), then press Enter. The example shown below should appear on your screen. The border should be dark.

Display

80X25 DISPLAY

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`a
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`ab
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abc
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcd
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcde
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcdef
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcdefg
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcdefgh
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcdefghi
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcdefghij
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ\^_`abcdefghijk
```

IS THE SCREEN CORRECT? (Y/N) -Y-

IS THE BORDER DARK AND ARE THE CHARACTERS PRESENT AND COMPLETE?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

Press Y (IS THE SCREEN CORRECT? (Y/N)), then press Enter. The example shown below should appear on your screen. The border should be light.

40X25 DISPLAY

```
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?  
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @  
" # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A  
# $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B  
$ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C  
% & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D  
& ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E  
' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F  
( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G  
) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H  
IS THE SCREEN CORRECT? (Y/N) -
```

**IS THE BORDER LIGHT AND ARE THE
CHARACTERS PRESENT AND COMPLETE?**

NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

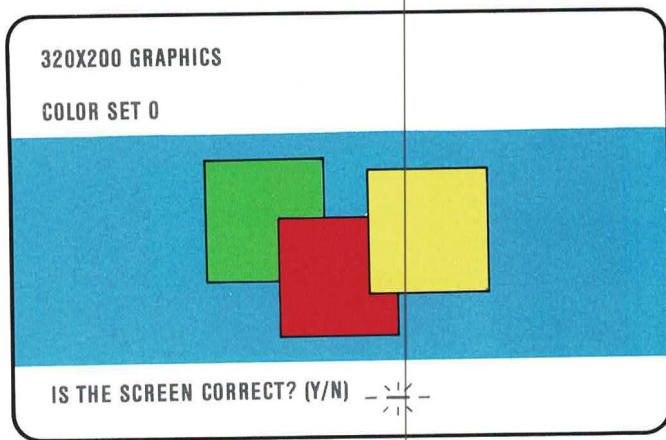
YES

Press Y (IS THE SCREEN CORRECT? (Y/N)), then press Enter. The example shown below should appear on your screen.

If your display is an internal display, go to the next page; otherwise, continue.

The background should be dark cyan. From left-to-right, the boxes should be intensified green, intensified red, and intensified yellow. The characters are intensified yellow.

Display



**IS THE GRAPHIC DISPLAY ON YOUR SCREEN
THE SAME AS THE EXAMPLE ABOVE?**

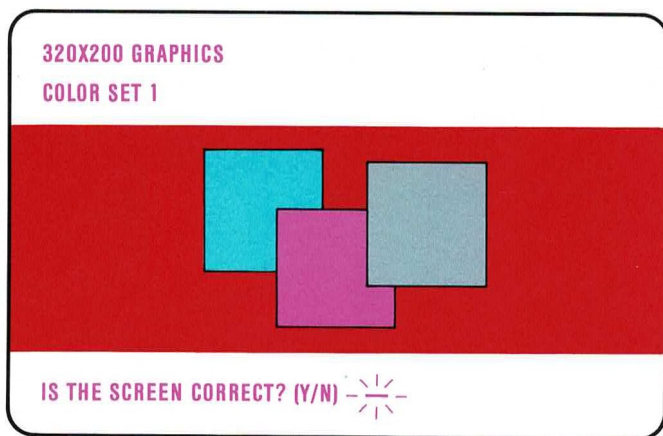
NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

YES

Press Y (**IS THE SCREEN CORRECT? (Y/N)**), then press Enter. The example shown below should appear on your screen.

If your display is an internal display, go to the next page; otherwise, continue.

The background should be intensified red. From left-to-right, the boxes should be dark cyan, dark magenta, and non-intensified white (light gray). The characters are dark magenta.



**IS THE GRAPHIC DISPLAY ON YOUR SCREEN
THE SAME AS THE EXAMPLE ABOVE?**

NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

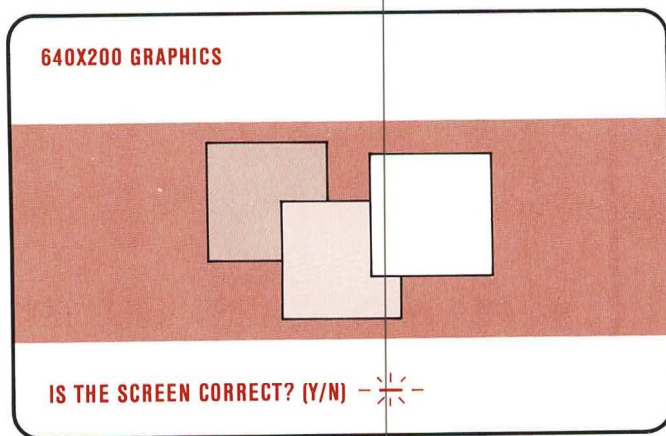
YES



Press Y (**IS THE SCREEN CORRECT? (Y/N)**), then press Enter. The example shown below should appear on your screen.

The background should be dark. From left-to-right the boxes should be shaded amber, shaded amber, and amber. The characters are amber.

Display



**IS THE GRAPHIC DISPLAY ON YOUR SCREEN
THE SAME AS THE EXAMPLE ABOVE?**

NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

YES

Press Y (IS THE SCREEN CORRECT? (Y/N)), then press Enter. The example shown below should appear on your screen.

LIGHT PEN TEST

SKIP LIGHT PEN TEST?  -

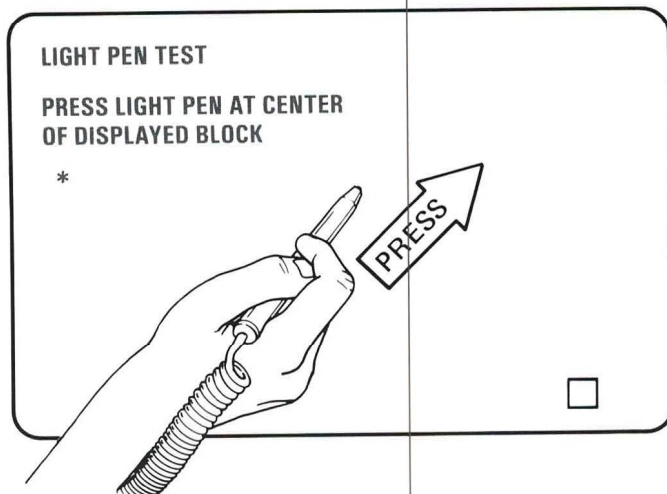
DO YOU HAVE A LIGHT PEN INSTALLED?

NO Go to page 3-500-22.

YES 

This is a timed test. If you wait longer than 60 seconds to respond, or if you are not careful where you place the tip of the pen before you push it, you may receive an invalid error message.

1. Place the tip of the light pen in the center of the block and press the pen toward the display as shown below. The block that was displayed will be replaced with an asterisk (*). Repeat this procedure for each new block that appears.
2. To start the test, press N (**SKIP LIGHT PEN TEST?**), then press Enter.



WERE YOU ABLE TO COMPLETE THE LIGHT PEN TEST (DISPLAY CHANGES TO VIDEO PAGE 0)?

NO Replace the light pen.

YES

Display

[illegible]

TYPE ANY KEY TO DISPLAY NEXT PAGE

- YES** Your display and Color/Graphics Monitor Adapter have successfully passed the diagnostics. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Remove the cover and system-board shield if not removed in an earlier step (see Section 5).
3. Insert the Advanced Diagnostics diskette into drive A.
4. If the expansion unit is attached, set its Power switch to On.
5. Set the system unit's Power switch to On.
6. Press the following keys in the sequence listed and listen for the appropriate audio response for each step.

Note: Do not use the numbers on the numeric keypad to enter this sequence; use the numbers on the top row of the keyboard.

Sequence

Press O then press Enter
Press Y then press Enter
Press O then press Enter
Press 5 then press Enter

Response

1 beep
1 beep
1 beep
2 beeps

**WERE YOU ABLE TO COMPLETE THE AUDIO
RESPONSE DIAGNOSTICS BY PRESSING THE
ABOVE SEQUENCE OF KEYS?**

NO You may have a power supply problem. Go to page 3-020-1.

YES

Your screen should match the example shown below.

COLOR/GRAPHICS MONITOR ADAPTER TEST

- 0 — DISPLAY ADAPTER TEST
- 1 — DISPLAY ATTRIBUTES
- 2 — CHARACTER SET
- 3 — 80X25 DISPLAY
- 4 — 40X25 DISPLAY
- 5 — 320X200 GRAPHICS
- 6 — 640X200 GRAPHICS
- 7 — LIGHT PEN TEST
- 8 — SCREEN PAGING
- 9 — EXIT TO MAIN MENU
- 10 — RUN ALL ABOVE TESTS
- 11 — VIDEO TEST
- 12 — SYNC TEST

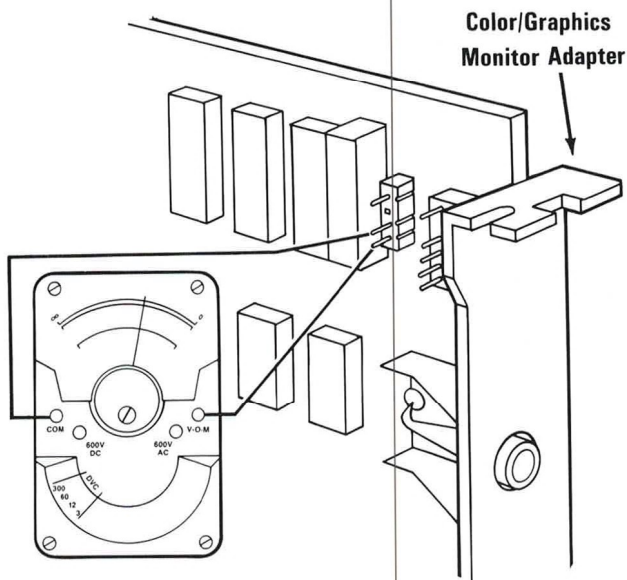
ENTER NUMBER OF DESIRED ACTION 

**ARE ALL THE CHARACTERS ON YOUR SCREEN
CORRECT AND READABLE?**

- NO** If your screen has no visible characters, or is completely blank, go to the next page. If the characters are not steady and readable, replace the Color/Graphics Monitor Adapter.

YES 

1. Disconnect the IBM Portable Personal Computer display's signal cable.
2. Select 11 then press Enter.
3. Measure the voltage at the signal pins shown in the figure below for 1.0 to 1.5 Vdc.
4. Measure the voltage between the center conductor and the outer edge of the composite video jack for 1.0 to 1.5 Vdc.

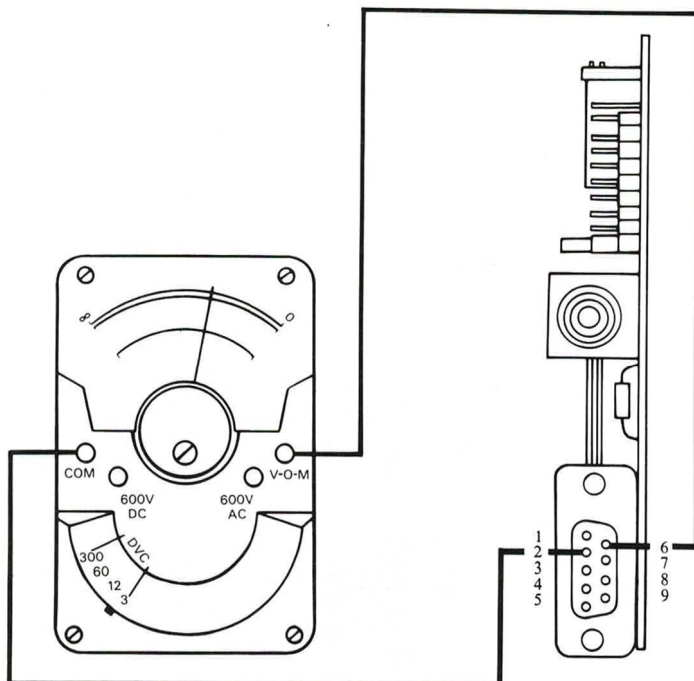


WERE BOTH OF THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

Measure the voltage between pin 2 (ground) and pins 3, 4, 5, and 6 (signal) of the nine-pin connector. All voltages should be between 2.5 and 5.5 Vdc.



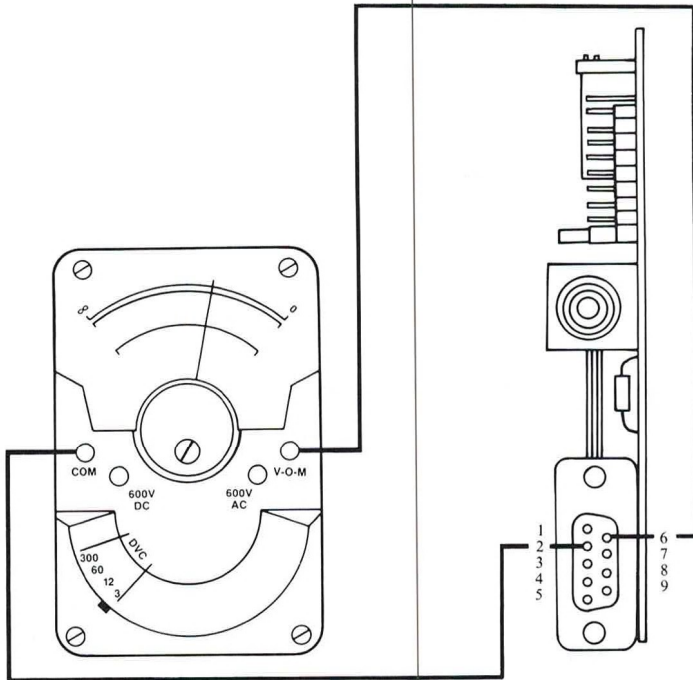
WERE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES



1. Press Enter once.
2. Measure the voltage between pin 2 (ground) and pins 3, 4, 5, and 6 (signal) of the nine-pin connector. All voltages should be between 0.0 and 0.5 Vdc.
3. Measure the voltage between the center conductor and the outer edge of the composite video for 0.0 to 0.9 Vdc.

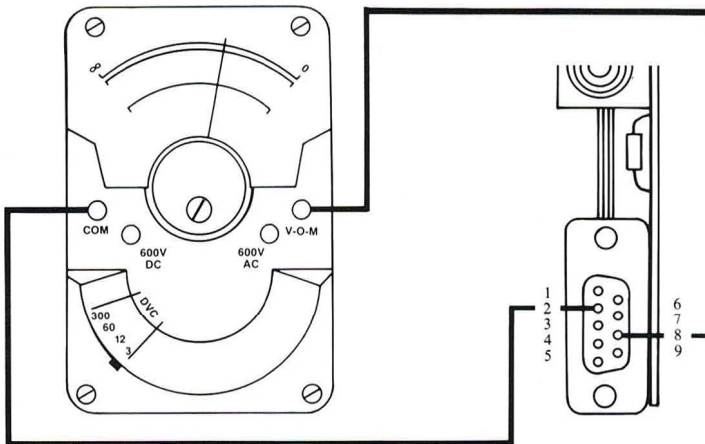


WERE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

1. Press 9 and listen for an audio response of two beeps.
2. Measure the voltage between pin 2 (ground) and pin 8 (signal) of the nine-pin connector. The voltage should be between 0.0 and 0.7 Vdc.
3. Measure the voltage between pin 2 (ground) and pin 9 (signal) of the nine-pin connector. The voltage should be between 0.0 and 0.3 Vdc.
4. Measure the voltage between the center conductor and the outer edge of the composite video jack for 0.5 to 1.5 Vdc.

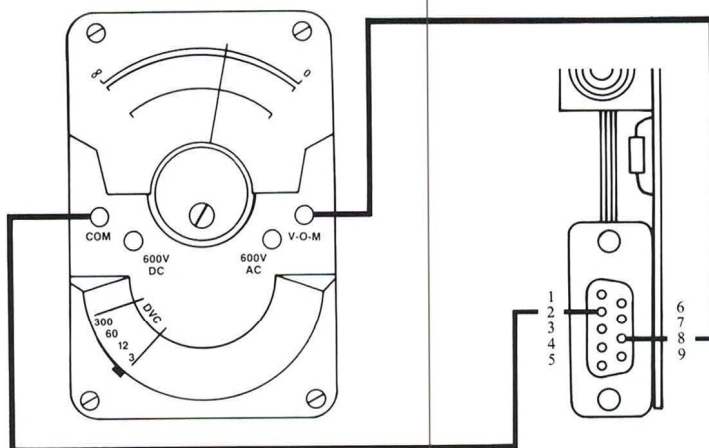


WERE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

1. Select 12 from the Color/Graphics Monitor Adapter Test menu, then press Enter.
2. Measure the voltage between pin 2 (ground) and pin 8 (signal) of the nine-pin connector. The voltage should be between 0.8 and 1.5 Vdc.
3. Measure the voltage between pin 2 (ground) and pin 9 (signal) of the nine-pin connector. The voltage should be between 0.3 and 1.0 Vdc.
4. Measure the voltage between the center conductor and the outer edge of the composite video jack for 0.2 to 0.6 Vdc.



WERE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES If the display has a detachable power cord, check the continuity of the power cord. If the power cord does not have continuity, replace the power cord; otherwise, replace the display (see Section 5).

Notes:

Diskette Drive

You have entered this PIC because you received a **6XX** error code, or you suspect a diskette drive problem.

Notes:

1. When measuring voltages in this PIC, use the system unit's frame as ground.
2. "Approximately 5 Vdc" includes a range from 2.0 to 5.5 Vdc, and "approximately 0 Vdc" includes a range from 0 to 0.8 Vdc.
3. If your system has two diskette drives and you are instructed to replace a diskette drive, reverse the signal cable connectors, to verify that the indicated drive is actually failing. The terminating resistor must always be installed on drive A.

Check to see that your diskette is free of damage, is formatted, and is inserted correctly.

Diskette

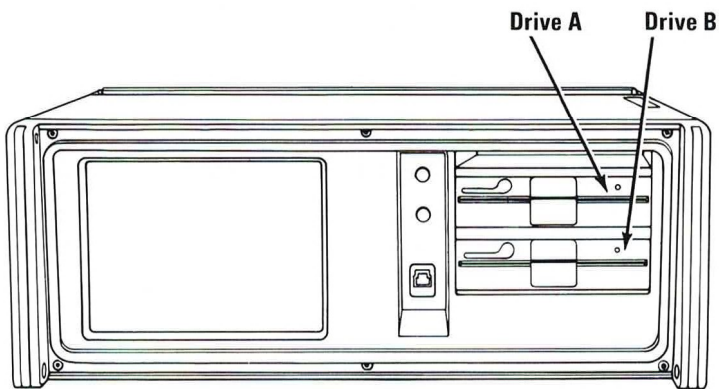
IS YOUR DISKETTE FREE OF DAMAGE, FORMATTED, AND INSERTED CORRECTLY?

NO Use another diskette or insert the diskette correctly, then go to page 3-3 and follow the PIC to verify that your system is operating correctly.

YES



See the figure below.



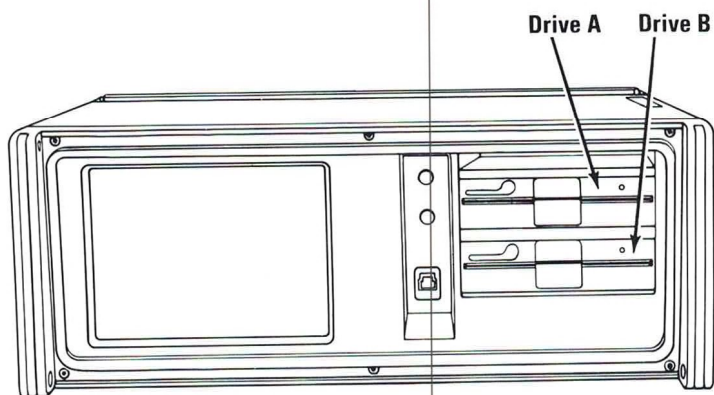
**DO YOU HAVE TWO DISKETTE DRIVES
INSTALLED IN YOUR SYSTEM?**

NO Go to page 3-600-6.

YES



See the figure below.



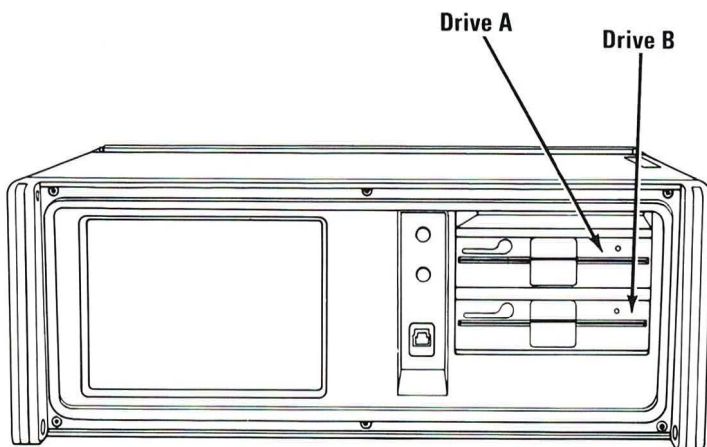
Diskette

DOES THE FAILURE OCCUR ON DRIVE A?

NO Go to page 3-600-6.

YES

1. Remove the system unit's cover (see Section 5).
 2. Remove the signal cable from diskette drive B.
 3. Remove the signal cable from diskette drive A and install it on diskette drive B.
 4. Set the system unit's Power switch to On.
 5. Retry the failing operation on diskette drive B.
-

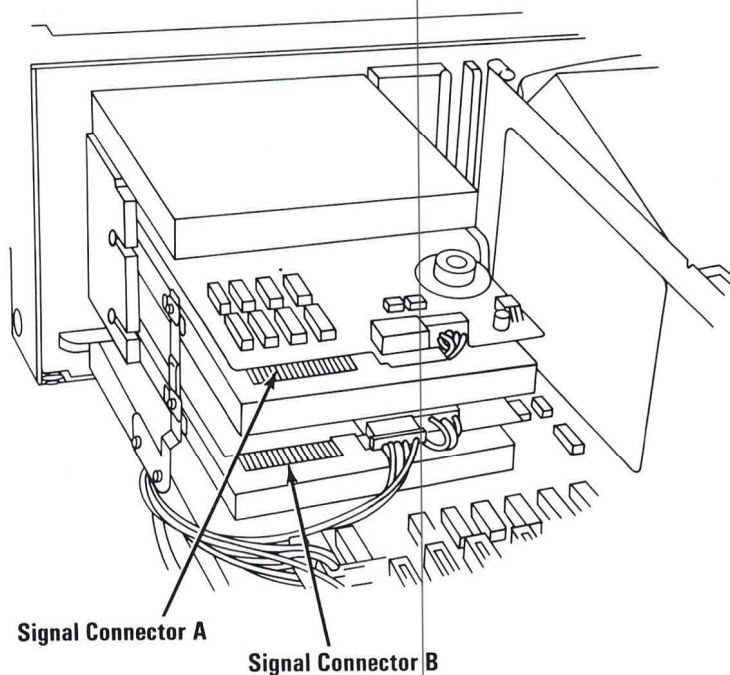


**DOES THE SAME FAILURE OCCUR ON
DISKETTE DRIVE B AS ON DISKETTE DRIVE A?**

YES Go to page 3-600-29.

NO

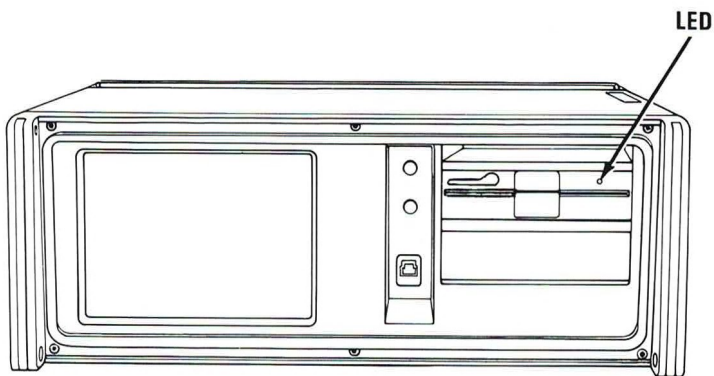
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Remove the signal cable from diskette drive B and install it on diskette drive A.
3. Install the diskette drive B signal connector on diskette drive B.



Diskette

CONTINUE

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Set the system unit's Power switch to On.
 5. Observe the In-Use light (LED) on drive A.
-



**DID THE LED ON DISKETTE DRIVE A LIGHT
JUST BEFORE THE BEEP AT THE END OF POST?**

NO Go to page 3-600-12.

YES 

Your screen should match the example shown below.

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version 2.XX (C) Copyright IBM Corp 1981, 1983

SELECT AN OPTION

- 0 – RUN DIAGNOSTIC ROUTINES
- 1 – FORMAT DISKETTE
- 2 – COPY DISKETTE
- 3 – PREPARE SYSTEM FOR RELOCATION
- 9 – EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

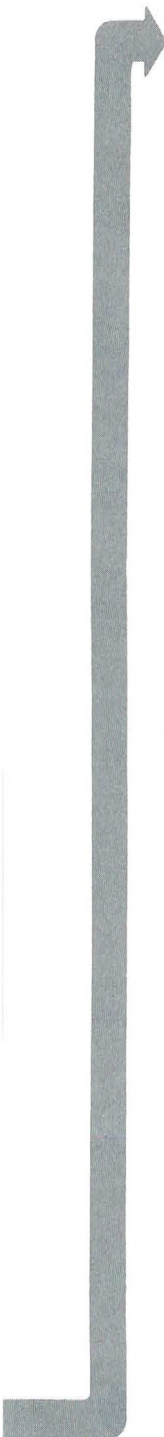
? 

Diskette

DOES YOUR SCREEN MATCH THE EXAMPLE
SHOWN ABOVE?

NO Go to page 3-600-14.

YES



Go to Step 3 if you have a formatted scratch diskette for each diskette drive.


1. Press 1 (**FORMAT DISKETTE**), then press Enter.
2. Follow the instructions on your screen and format a diskette to be used as a scratch diskette.

Note: If two diskette drives are installed in the system unit, format two scratch diskettes.

3. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 4. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 5. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 6. Press 1 (**RUN TESTS MULTIPLE TIMES**), then press Enter.
 7. Press 6 (**DISKETTE DRIVE(S) AND ADAPTER**), then press Enter.
 8. Press 1 (**ENTER NUMBER OF TIMES TO RUN TESTS**), then press Enter.
-

CONTINUE



- 
1. Press Y (**WAIT EACH TIME AN ERROR OCCURS (Y/N)?**) then press Enter.
 2. Follow the instructions on your screen to begin the diskette drive tests.
-



611 TIME OUT C
80210200090006
0301020005

Diskette

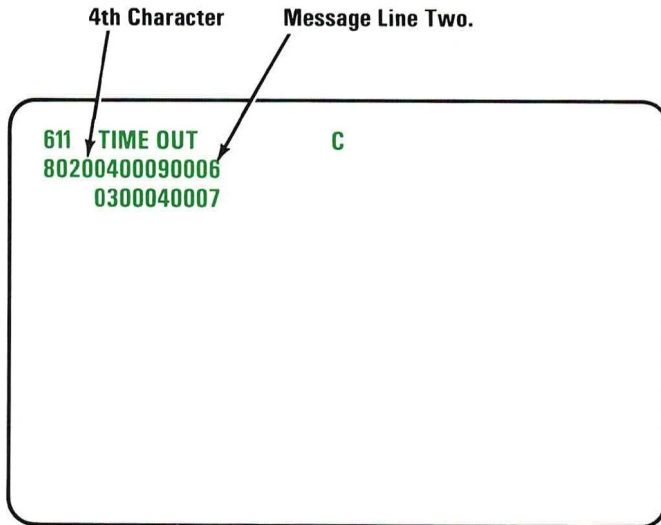
**DID YOU RECEIVE AN ERROR CODE SIMILAR
TO THE ONE SHOWN ABOVE?**

NO Go to page 3-600-18.

YES 

The fourth character of message line 2 indicates which diskette drive is failing. If the character is 0, the failure is with drive A. If the character is 1, the failure is with drive B.

1. Make a note of the error code and the fourth character on your screen.
 2. Format another diskette using the failing drive.
Make a note of the error code and continue on this page.
-

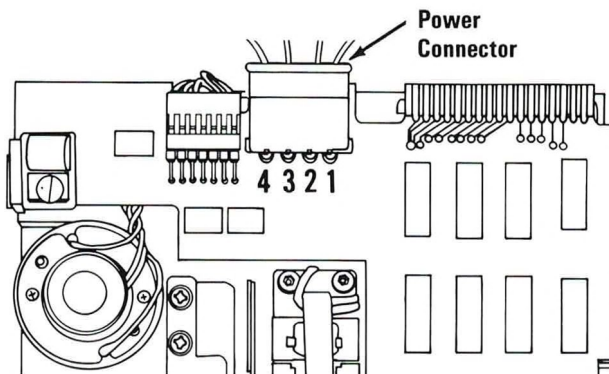


CONTINUE

Find your error code in the table below. Replace the failing part, or go to the page that matches your error code.

Error Code	Page
606	3-600-27
607	3-600-24
608	Replace the Diskette Drive
611	3-600-27
612	3-600-22
613	3-600-22
621	3-600-26
622	3-600-26
623	3-600-26
624	3-600-26
625	3-600-26
626	3-600-26

1. Remove the system unit's cover (see Section 5).
 2. Check the power connector on the diskette drive for the voltages listed in the table below. If two diskette drives are installed, the voltages listed in the table apply to both.
-



Diskette Drive Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.25	3	4
+ 11.52	+ 12.6	2	1

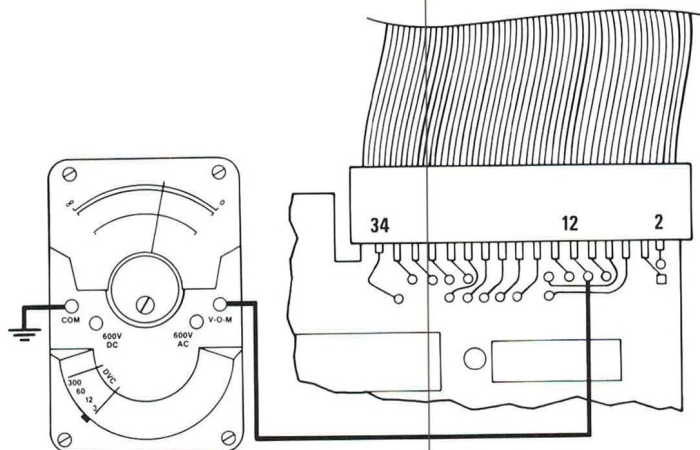
**ARE THE VOLTAGES WITHIN THE LIMITS
INDICATED IN THE TABLE ABOVE?**

NO Go to page 3-020-1.

YES



1. Set the Power switch on the system unit (and expansion unit, if attached) to Off for at least 5 seconds.
2. Connect the multimeter between pin 12 of the signal cable's connector and ground, as shown in the figure below.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On.
5. Check if the voltage decreases from approximately 5 Vdc at the start of the POST to approximately 0 Vdc during the POST.



Diskette

DID THE VOLTAGE DECREASE TO APPROXIMATELY 0 Vdc DURING POST?

NO Replace the Diskette Drive Adapter (see Section 5).

YES Replace the diskette drive (see Section 5).

1. Remove the Advanced Diagnostics diskette.
 2. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Remove the failing diskette drive (see Section 5).
 5. Install the power and signal connectors on the diskette drive.
 6. Set the system unit's Power switch to On.
 7. Observe the spindle during the POST.
-

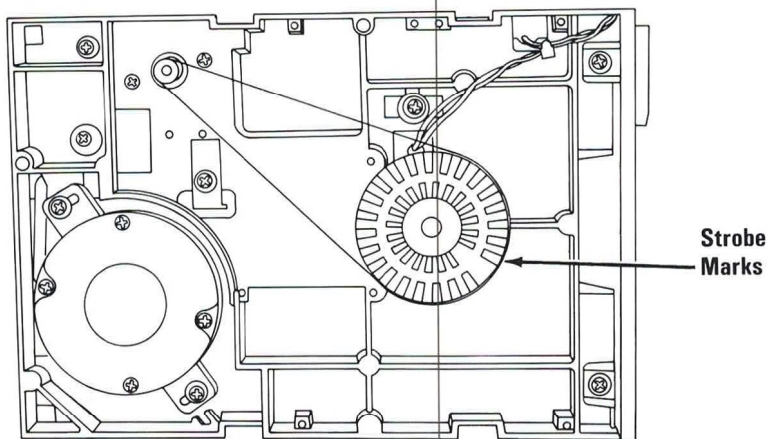
**DID THE SPINDLE BEGIN TO ROTATE BEFORE
THE BEEP AT THE END OF POST?**

NO Go to page 3-600-19.

YES 

Go to Section 5 and do the diskette-drive-motor preliminary speed test. Then return to this page and answer the question below.

Note: You need a fluorescent light to see the strobe effect of this test.



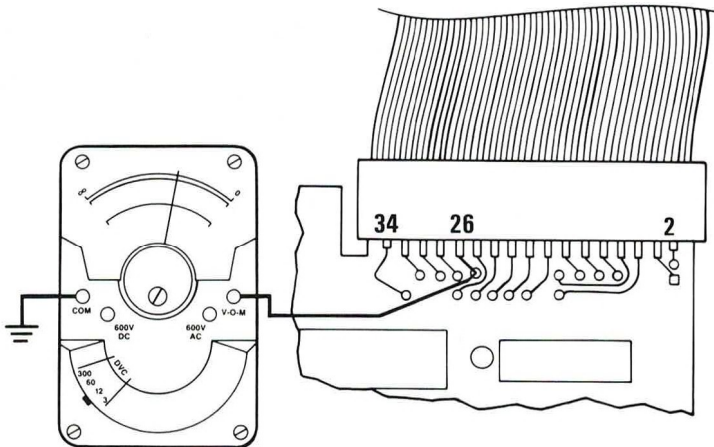
Diskette

IS THE SPEED OF THE DRIVE CORRECT?

NO If you are unable to adjust the speed satisfactorily, replace the diskette drive (see Section 5).

YES

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Connect the multimeter between pin 26 of the signal cable's connector and ground, as shown in the figure below.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Set the system unit's Power switch to On.
 5. Ensure the voltage is between 2.0 and 5 Vdc at the start of the POST.
-



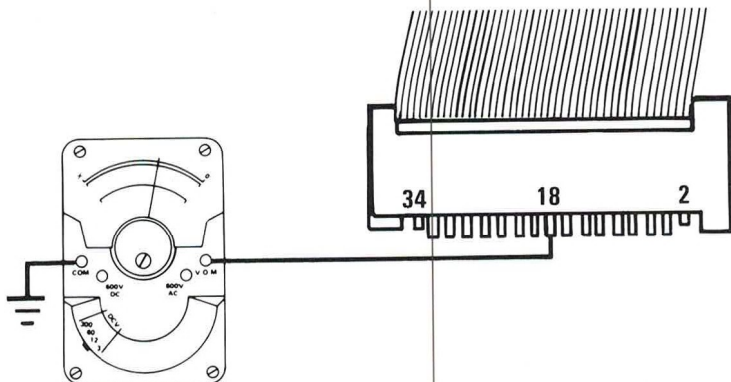
**WAS THE VOLTAGE BETWEEN PIN 26 AND
GROUND 5 Vdc AT THE START OF POST?**

NO Go to page 3-600-22.

YES



1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Ensure that a terminating resistor is installed in diskette drive A only.
3. Connect the multimeter between pin 18 of the signal cable's connector and ground, as shown in the figure below.
4. If the expansion unit is attached, set its Power switch to On.
5. Set the system unit's Power switch to On.
6. Check the voltage at pin 18 as shown in the figure below.



DID THE VOLTAGE BETWEEN PIN 18 AND GROUND GO FROM 5 Vdc TO 0 Vdc AND BACK TO 5 Vdc DURING POST?

NO Go to page 3-600-22.

YES Replace the diskette drive (see Section 5) and go to 3-600-1 and follow the PIC. If this is your second time at this point and your problem still exists, replace the Diskette Drive Adapter.

The screen displays the capacity of the diskette drives installed in your system. Ensure that the diskette drives are recognized as Double Sided drives as shown below.

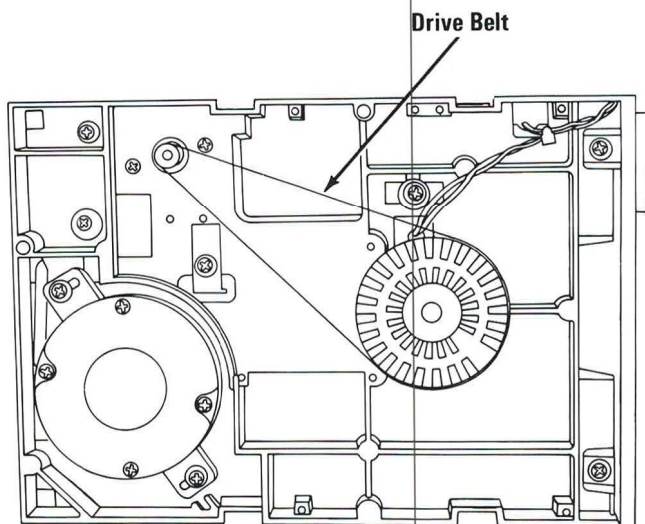
**TESTING – 1 DISKETTE DRIVE(S) AND ADAPTER
DISKETTE A: IS DOUBLE SIDED
1 DISKETTE DRIVE(S) AND ADAPTER**

600 S

IS THE DISKETTE DRIVE CAPACITY CORRECT?

- NO** Replace the diskette drive that is shown incorrectly in the message (see Section 5).
- YES** Your diskette drive and adapter have successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Check the diskette-drive belt.



Diskette

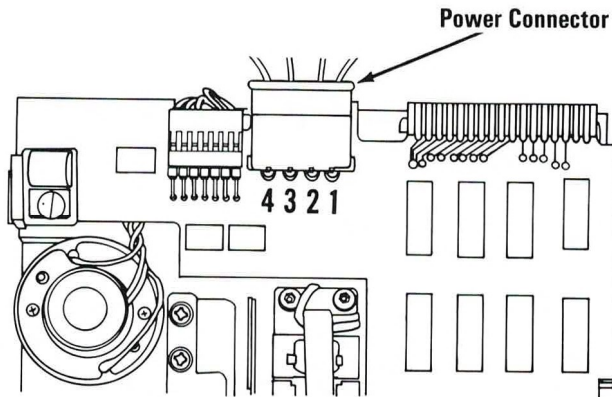
**IS THE DRIVE BELT INSTALLED ON THE
PULLEYS CORRECTLY AND IN GOOD
CONDITION?**

NO Replace the drive belt (see Section 5).

YES



1. Remove the system unit's cover (see Section 5).
2. Check the power connector on the diskette drive for the voltages listed in the table below. If two diskette drives are installed, the voltages listed in the table apply to both.



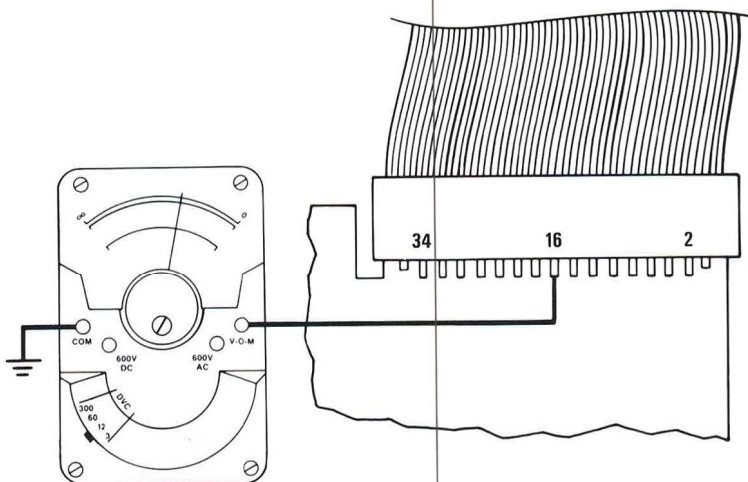
Diskette Drive Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.25	3	4
+ 11.52	+ 12.6	2	1

**ARE THE VOLTAGES WITHIN THE LIMITS
INDICATED IN THE TABLE ABOVE?**

NO Go to page 3-020-1.

YES

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Connect the multimeter between pin 16 of the signal cable's connector and ground, as shown in the figure below.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On.
5. Check that the voltage decreases from approximately 5.0 Vdc at the start of the POST to approximately 0 Vdc at the end of the POST.



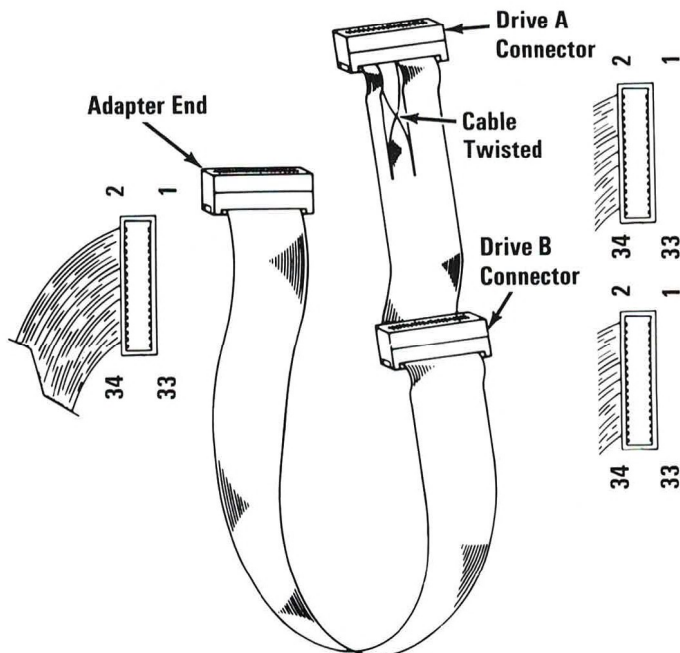
DID THE VOLTAGE BETWEEN PIN 16 AND GROUND DECREASE TO APPROXIMATELY 0 Vdc?

YES Replace the diskette drive (see Section 5).

NO

Check the continuity of the diskette-drive cable as follows:

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Disconnect the diskette drive's signal cable from the Diskette Drive Adapter and the diskette drive.
3. Set your meter to the Ohms x 1 scale.
4. See the tables on the next page and check the continuity of the signal cable.



CONTINUE

Check for continuity from pin number to pin number except for those numbers preceded by an asterisk.

Diskette Drive A Signal-Cable Connector		Diskette Drive B Signal Cable Connector	
Even Pin Numbering Diskette	Adapter	Even Pin Numbering Diskette	Adapter
2	2	2	2
4	4	4	4
6	6	6	6
8	8	8	8
*10	16	10	10
*12	14	12	12
*14	12	14	14
*16	10	16	16
18	18	18	18
20	20	20	20
22	22	22	22
24	24	24	24
26	26	26	26
28	28	28	28
30	30	30	30
32	32	32	32
34	34	34	34
Odd Pin Numbering Diskette	Adapter	Odd Pin Numbering Diskette	Adapter
1	1	1	1
3	3	3	3
5	5	5	5
7	7	7	7
9	9	9	9
*11	15	11	11
13	13	13	13
*15	11	15	15
17	17	17	17
19	19	19	19
21	21	21	21
23	23	23	23
25	25	25	25
27	27	27	27
29	29	29	29
31	31	31	31
33	33	33	33

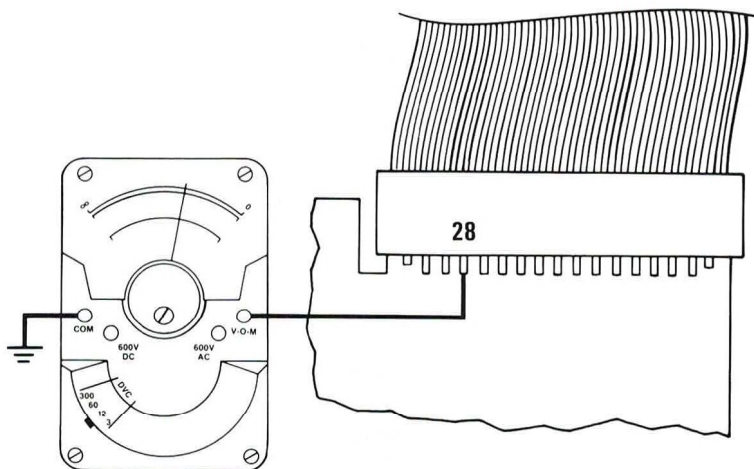
Diskette

IS THE CONTINUITY OF THE SIGNAL CABLE CORRECT?

NO Replace the signal cable (see Section 5).

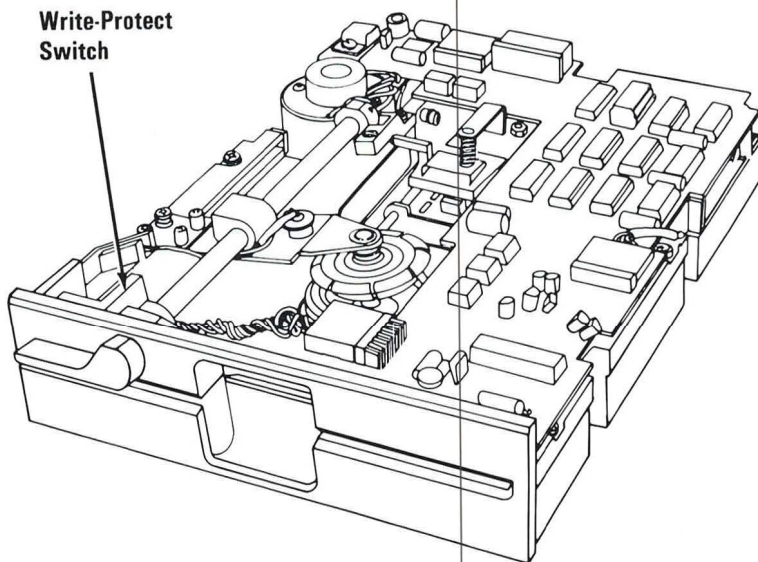
YES Replace the diskette drive (see Section 5) and go to 3-600-1 and follow the PIC. If this is your second time at this point and your problem still exists, replace the Diskette Drive Adapter.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Connect the multimeter between pin 28 of the signal cable's connector and ground, as shown in the figure below.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On.
5. Alternately insert and remove a diskette approximately 5 cm (2 in.) and check that the voltage decreases from approximately 5.0 Vdc to approximately 0 Vdc each time the write-protect switch is operated while the diskette drive In-Use light (LED) is on. If diskette drive B is being tested, exchange the signal cable connectors with diskette drive A.



CONTINUE

See the figure below.



Diskette

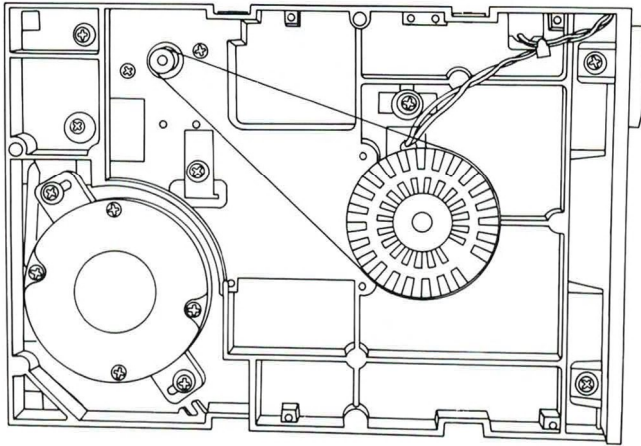
**DID THE VOLTAGE DECREASE FROM
APPROXIMATELY 5.0 Vdc TO 0 Vdc EACH TIME
THE WRITE-PROTECT SWITCH WAS OPERATED
WHILE THE LED WAS ON?**

NO If approximately 5.0 Vdc was never present, go to page 3-600-19. If the voltage did not decrease from approximately 5.0 Vdc to 0 Vdc, replace the diskette drive (see Section 5).

YES Replace the Diskette Drive Adapter (see Section 5).

See Section 5 and do the diskette-drive-motor preliminary speed test. Then return to this page and answer the question below.

Note: You need a fluorescent light to see the strobe effect of this test.



IS THE SPEED OF THE DRIVE CORRECT?

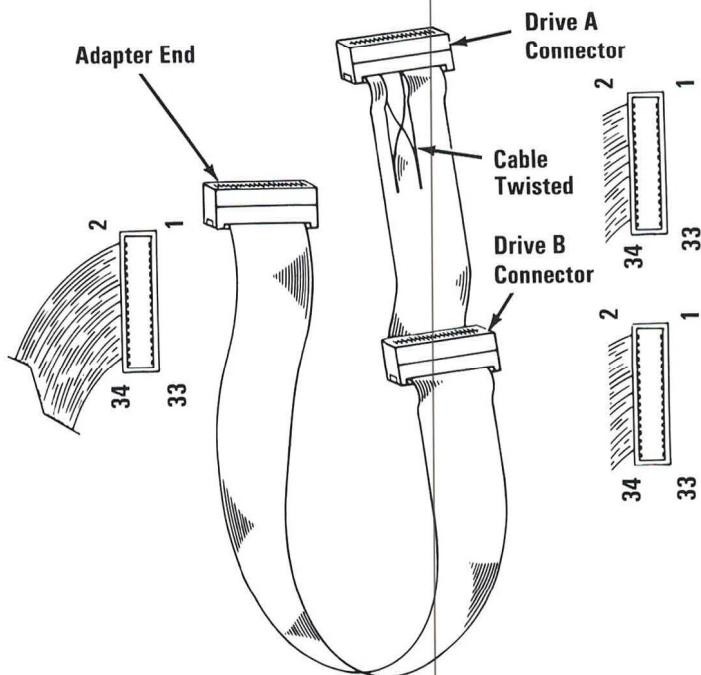
NO Adjust the speed of the diskette drive (see Section 5). If you are unable to adjust the diskette drive speed satisfactorily, go to page 3-600-27.

YES



Check the continuity of the diskette-drive cable as follows:

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Disconnect the diskette drive's signal cable from the Diskette Drive Adapter and the diskette drive.
3. Set your meter to the Ohms x 1 scale.
4. See the tables on the next page and check the continuity of the signal cable.



Diskette

CONTINUE

Check continuity from pin number to pin number, except for those numbers preceded by an asterisk.

Diskette Drive A Signal-Cable Connector		Diskette Drive B Signal Cable Connector	
Even Pin Numbering Diskette	Adapter	Even Pin Numbering Diskette	Adapter
2	2	2	2
4	4	4	4
6	6	6	6
8	8	8	8
*10	16	10	10
*12	14	12	12
*14	12	14	14
*16	10	16	16
18	18	18	18
20	20	20	20
22	22	22	22
24	24	24	24
26	26	26	26
28	28	28	28
30	30	30	30
32	32	32	32
34	34	34	34
Odd Pin Numbering Diskette	Adapter	Odd Pin Numbering Diskette	Adapter
1	1	1	1
3	3	3	3
5	5	5	5
7	7	7	7
9	9	9	9
*11	15	11	11
13	13	13	13
*15	11	15	15
17	17	17	17
19	19	19	19
21	21	21	21
23	23	23	23
25	25	25	25
27	27	27	27
29	29	29	29
31	31	31	31
33	33	33	33

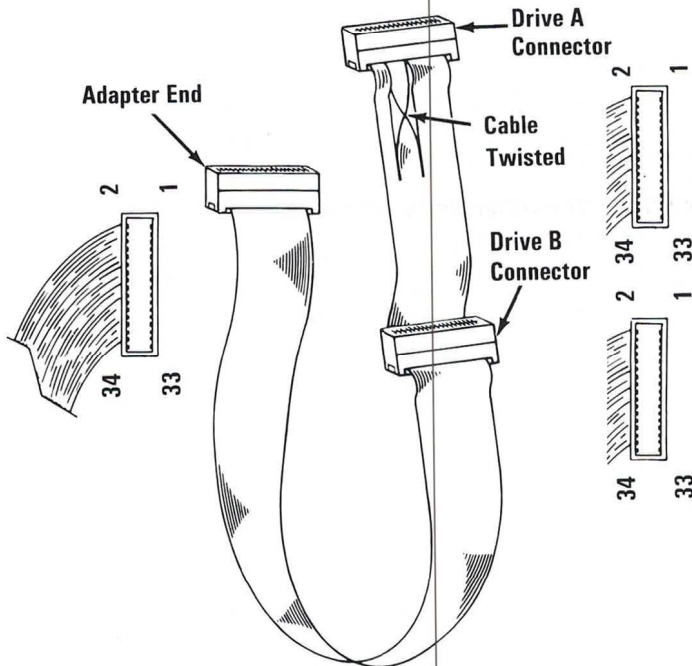
IS THE CONTINUITY OF THE SIGNAL CABLE CORRECT?

NO Replace the signal cable (see Section 5).

YES Replace the diskette drive (see Section 5) and go to 3-600-1 and follow the PIC. If this is your second time at this point and your problem still exists, replace the Diskette Drive Adapter.

Check the continuity of the diskette-drive cable as follows:

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Disconnect the diskette drive's signal cable from the Diskette Drive Adapter and the diskette drive.
3. Set your meter to the Ohms x 1 scale.
4. See the tables on the next page and check the continuity of the signal cable.



Diskette

CONTINUE

Check continuity from pin number to pin number, except for those numbers preceded by an asterisk.

Diskette Drive A Signal-Cable Connector		Diskette Drive B Signal Cable Connector	
Even Pin Numbering Diskette Adapter		Even Pin Numbering Diskette Adapter	
2	2	2	2
4	4	4	4
6	6	6	6
8	8	8	8
*10	16	10	10
*12	14	12	12
*14	12	14	14
*16	10	16	16
18	18	18	18
20	20	20	20
22	22	22	22
24	24	24	24
26	26	26	26
28	28	28	28
30	30	30	30
32	32	32	32
34	34	34	34
Odd Pin Numbering Diskette Adapter		Odd Pin Numbering Diskette Adapter	
1	1	1	1
3	3	3	3
5	5	5	5
7	7	7	7
9	9	9	9
*11	15	11	11
13	13	13	13
*15	11	15	15
17	17	17	17
19	19	19	19
21	21	21	21
23	23	23	23
25	25	25	25
27	27	27	27
29	29	29	29
31	31	31	31
33	33	33	33

IS THE CONTINUITY OF THE SIGNAL CABLE CORRECT?

NO Replace the signal cable (see Section 5).

YES Replace the Diskette Drive Adapter (see
Section 5).

Math Coprocessor

You have entered this PIC because you have a **7XX** error code or have identified a Math Coprocessor problem.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Set the system unit's Power switch to On.
 5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 7. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 8. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
-

CONTINUE



Press 7 (**MATH COPROCESSOR**), then press Enter.

The screen message shown below should appear for up to 10 seconds.

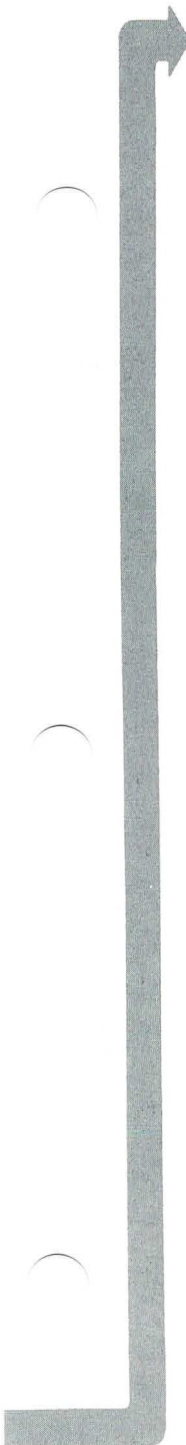
TESTING MATH COPROCESSOR

**WAS THE MESSAGE DISPLAYED FOR 10
SECONDS OR LESS?**

NO Replace both the Math Coprocessor and the
8088 Processor (see Section 5).

YES






You may receive an error message similar to the example below.

ERROR MATH COPROCESSOR 701 S
SWITCH 1 – 2 INCORRECT
PRESS ENTER TO CONTINUE

DID YOU COMPLETE THE TEST WITHOUT AN ERROR MESSAGE?

- NO** Set all Power switches to Off. Check that the switch settings are correct (see Section 6). If the switch settings are correct, replace the system board. Remove the Math Coprocessor and the 8088 Processor and install them on the new system board (see Section 5). Go to page 3-700-1 and follow the PIC.

YES 



You may receive an error message similar to the example below.

ERROR – MATH COPROCESSOR 701 S

**DID YOU COMPLETE THE TEST WITHOUT
RECEIVING AN ERROR MESSAGE?**

- NO** Replace both the Math Coprocessor and the 8088 Processor (see Section 5).
- YES** You have successfully completed the Math Coprocessor diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Printer Adapter

You have entered this PIC because you have a **90X** error code or have identified a Printer Adapter problem.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Remove the printer cable from the rear of the system unit.
3. Insert the Advanced Diagnostics diskette into drive A.
4. If the expansion unit is attached, set its Power switch to On.
5. Set the system unit's Power switch to On.
6. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
7. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
8. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
9. Press 0 (**RUN TESTS ONE TIME**), then press Enter.

CONTINUE





Press 9 (**PRINTER ADAPTER**), then press Enter.

You may receive an error message similar to the one shown below.

**X:XX:XX
ERROR-PRINTER ADAPTER
90X**

PRESS ENTER TO CONTINUE 

DID YOU RECEIVE AN ERROR MESSAGE?

YES Replace the Printer Adapter (see Section 5).

NO 

If you did not receive an error message, you received a message similar to the one shown below.

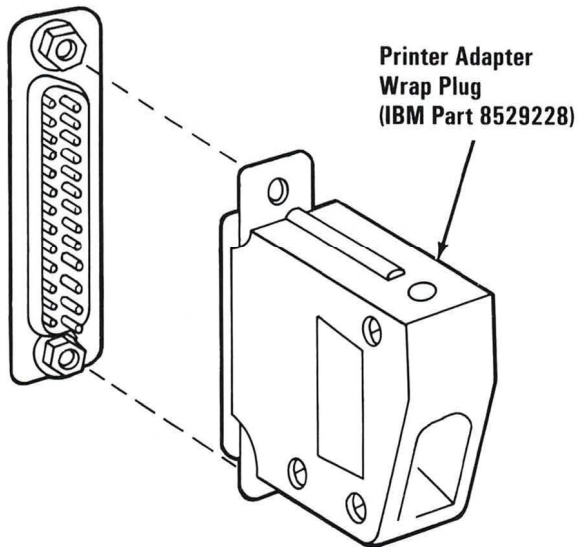
Note: Do not press Enter at this time.

TESTING – PRINTER ADAPTER

INSERT WRAP PLUG AND PRESS "ENTER" 

CONTINUE

Install the Printer Adapter wrap plug, as shown below.
(If you do not install the wrap plug, you will receive an
invalid error message.)



CONTINUE

Press Enter to begin the test. An error message similar to the one shown below may appear.

0:06:21
ERROR — PRINTER ADAPTER 901 E

PRESS ENTER TO CONTINUE 

DID YOU RECEIVE AN ERROR MESSAGE?

NO Remove the Printer Adapter wrap plug. You have successfully completed the Printer Adapter diagnostic tests.

YES Replace the printer adapter (see Section 5).

Notes:

Asynchronous Communications Adapter

You have entered this PIC because you have an **11XX** error code or have identified a problem with asynchronous communications.


Before doing the diagnostic routines, see Section 4 and ensure the following conditions have been met:

- The primary Asynchronous Communications Adapter's address module is set for primary operation.
 - If you have a second Asynchronous Communications Adapter, its address module is set for Alternate Asynchronous Adapter Communications operation.
 - All Asynchronous Communications Adapters are set for RS-232C operation.
-

Asynch

CONTINUE



- 
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Set the system unit's Power switch to On. If an error occurs at this time, press the F1 key to continue.
 5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 7. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 8. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
-

CONTINUE



- 
1. Select 11 (**ASync COMMUNICATIONS ADAPTER**), then press Enter.
 2. Press Y or N (**IS AN IBM COMMUNICATIONS CABLE ATTACHED?**), then press Enter.

The screen should now instruct you to install the wrap plug on either the Asynchronous Communications Adapter on the IBM Communications Adapter Cable.

TESTING – ASync COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ASync ADAPTER (Y/N) y**

**INSTALL THE WRAP PLUG ON THE END
OF THE CABLE AND PRESS ENTER** 

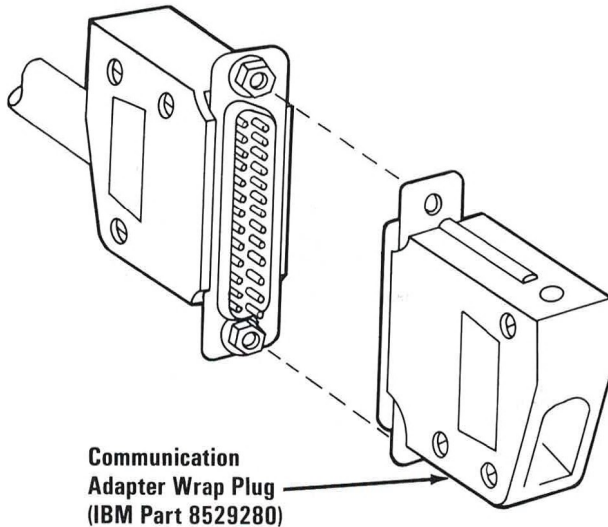
Asynch

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-1100-5.

YES 

1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
 2. Press Enter to begin the test. The test may take up to 15 seconds.
-



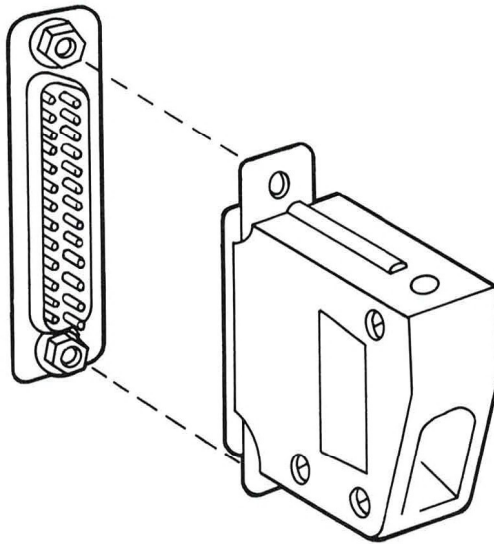
**DOES THE MESSAGE ON YOUR SCREEN
INSTRUCT YOU TO INSTALL THE WRAP PLUG
ON THE ASYNC ADAPTER?**

NO Your Asynchronous Communications Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

YES



1. Remove all cables from the Asynchronous Communications Adapter.
 2. Refer to the figure below and install the wrap plug on the Asynchronous Communications Adapter's connector.
 3. Press Enter to begin the test. The test may take up to 15 seconds.
-



Asynch

DID THE TEST RUN WITHOUT AN ERROR?

- NO** Replace the Asynchronous Communications Adapter (see Section 5).
- YES** Your Asynchronous Communications Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Notes:

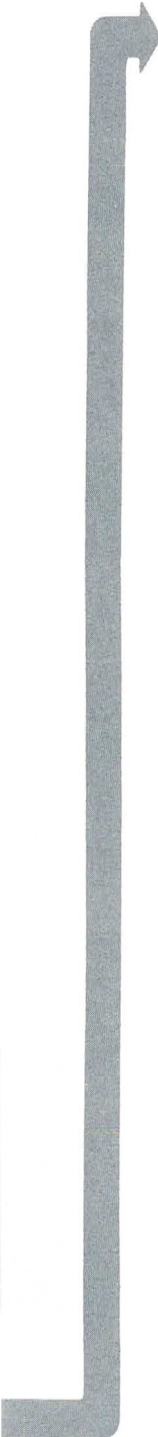
Alternate Asynchronous Communications Adapter

You have entered this PIC because you have a **12XX** error code or have identified a problem with the Alternate Asynchronous Communications Adapter.

Before doing the diagnostic routines, go to Section 4 and ensure the following conditions have been met:

- The primary Asynchronous Communications Adapter's address module is set for primary operation.
- The alternate Asynchronous Communications Adapter's address module is set for secondary operation.
- Both Asynchronous Communications Adapters are set for RS-232C operation.



- 
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. If the expansion unit is attached, set its Power switch to On.
 4. Set the system unit's Power switch to On. If an error occurs at this time, press the F1 key to continue.
 5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 7. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 8. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
-

CONTINUE



- 
1. Select 12 (**ALT ASYNC COMMUNICATIONS ADAPTER**), then press Enter.
 2. Press Y or N (**IS AN IBM COMMUNICATIONS CABLE ATTACHED?**), then press Enter.

The screen now instructs you to install the wrap plug on either the alternate Asynchronous Communications Adapter or the IBM Communications Cable.

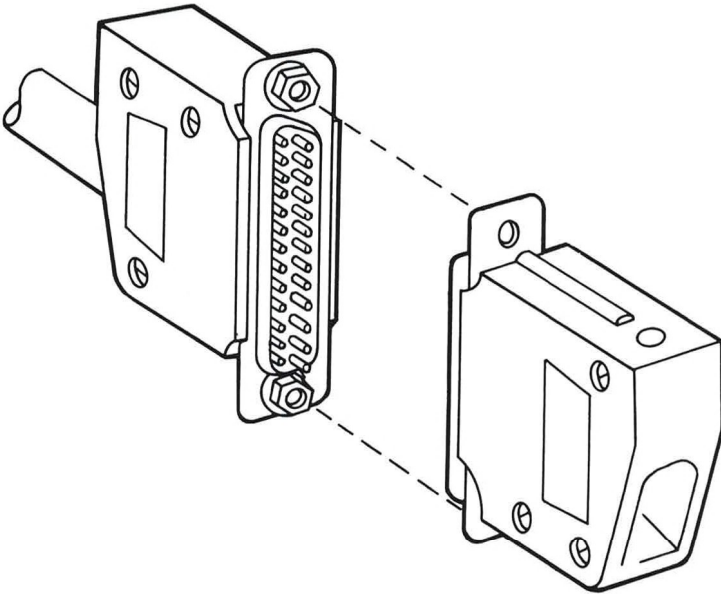
**TESTING – ALT ASYNC COMMUNICATIONS ADPT
IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT ASYNC ADAPTER (Y/N) y
INSTALL THE WRAP PLUG ON THE END
OF THE CABLE AND PRESS ENTER**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-1200-5.

YES 

1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
 2. Press Enter to begin the test. The test may take up to 15 seconds.
-



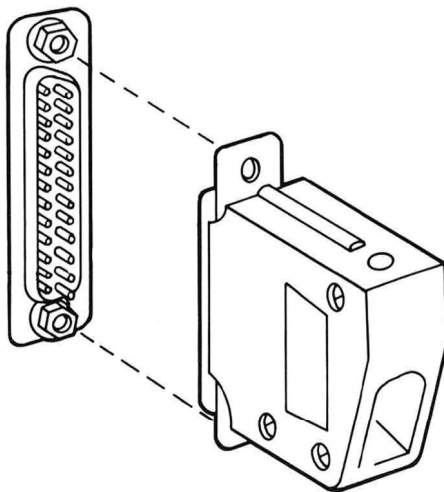
**DOES THE MESSAGE ON YOUR SCREEN
INSTRUCT YOU TO INSTALL THE WRAP PLUG
ON THE ALTERNATE ASYNC ADAPTER?**

NO Your alternate Asynchronous Communications Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

YES



1. Remove all cables from the alternate Asynchronous Communications Adapter.
 2. Refer to the figure below and install the wrap plug on the alternate Asynchronous Communications Adapter's connector.
 3. Press Enter to begin the test. The test may take up to 15 seconds.
-



DID THE TEST RUN WITHOUT AN ERROR?

- NO** Replace the alternate Asynchronous Communications Adapter (see Section 5).
- YES** Your alternate Asynchronous Communications Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Notes:

Game Control Adapter

You have entered this PIC because you have a **13XX** error code or have identified a problem with the Game Control Adapter.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Insert your Advanced Diagnostics diskette in drive A.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On. If an error occurs at this time, press the F1 key to continue.
5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
7. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
8. Press 0 (**RUN TESTS ONE TIME**), then press Enter.

CONTINUE





Select 13 (**GAME CONTROL ADAPTER**), then press Enter.

The following message will appear on your screen.

**TESTING – GAME CONTROL ADAPTER
DO YOU HAVE JOY STICKS, PADDLES,
OR NOTHING ATTACHED (J P N)?** 

ARE THE JOYSTICKS OR PADDLES INSTALLED?

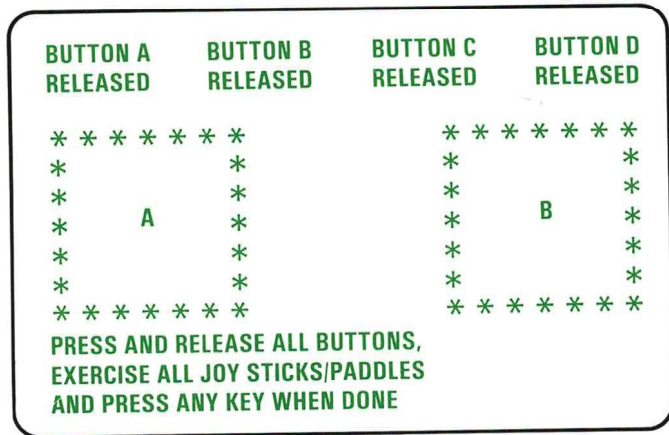
NO Connect the joysticks or paddles and go to page 3-1300-3.

YES 

- 

2. Press 2 or 4 (**HOW MANY BUTTONS DO YOU HAVE (2/4?)**), then press Enter. Do not select 4 if you have only two buttons.

The following screen presentation should appear.

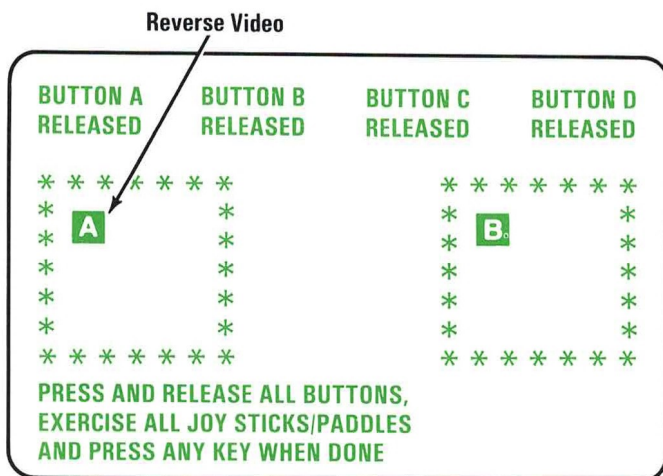


DID THE SCREEN APPEAR WITHOUT AN ERROR CODE?

NO Replace the Game Control Adapter (see Section 5).

YES

If one or more of the joysticks/paddles appear on the screen in reverse video, check the connector before continuing. Move the joysticks/paddles in all directions. Ensure the letter inside the box on the screen moves in all directions without going into reverse video.

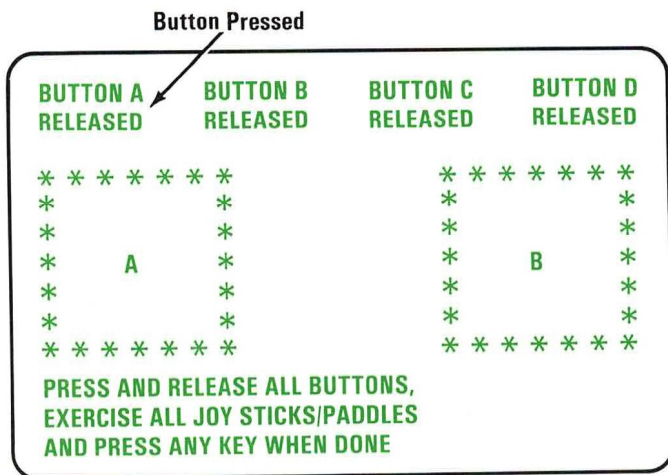


DID ALL JOYSTICKS/PADDLES MOVE IN ALL DIRECTIONS WITHOUT GOING INTO REVERSE VIDEO?

- NO** If the joysticks/paddles move but go into reverse video at the boundary of the box, replace the malfunctioning joysticks/paddles. If one joystick/paddle does not move and stays in reverse video, replace the joysticks/paddles. If one or more of the joysticks/paddles stay in reverse video but can move, replace the Game Control Adapter (see Section 5).

YES

1. Press and release all buttons on the joysticks/paddles. All buttons must be pressed or an invalid error code will occur. When a button is pressed, the corresponding prompt on the screen changes from **RELEASED** to **PRESSED**.
2. After pressing all buttons on the joysticks/paddles, press any key on the keyboard to continue.



DID YOU COMPLETE THE TEST WITHOUT AN ERROR CODE?

NO If all buttons showed **PRESSED** when tested, replace the Game Control Adapter (see Section 5). If one or more of the buttons did not show **PRESSED** when tested, replace the malfunctioning joysticks/paddles.

YES Your Game Control Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Notes:

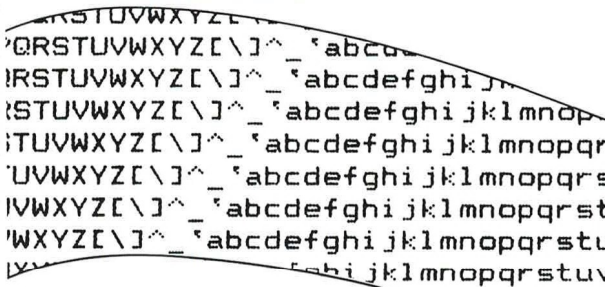
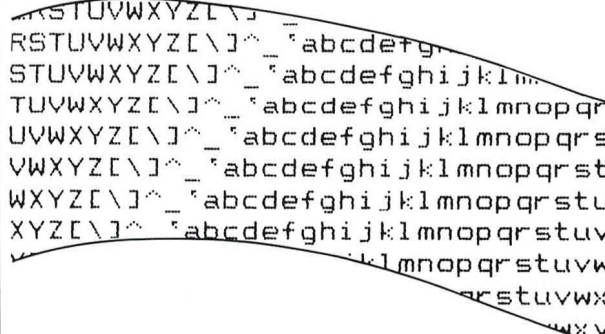
Graphics Printer

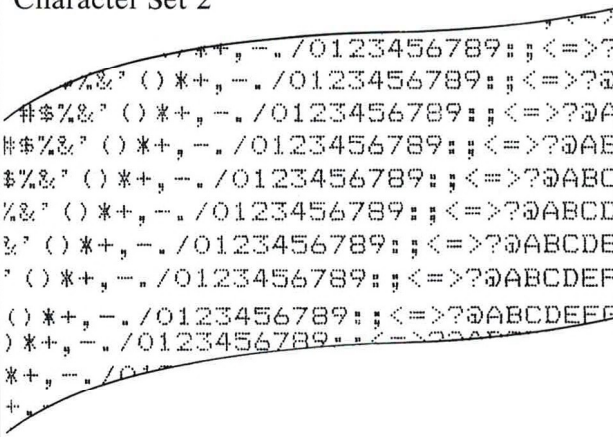
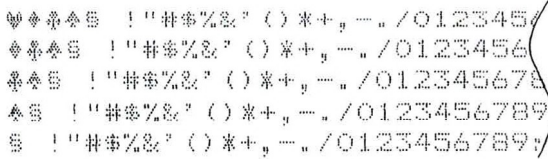
You have entered this PIC because you have a 14XX error code or have identified a problem with your matrix and graphics printer.

Error Description	Diagnostic Action
1400 Printer Entry	<p>1. Set the printer's Power switch to Off. Verify that the forms are properly inserted. Move the print head to the left-most position. Set the printer's Power switch to On.</p> <p>Are the Power, Ready and Online lights on?</p> <p>YES: Go to step 2. NO: Go to page 3-1400-34, "Control Panel," and follow each step until the failing FRU is isolated.</p> <p>2. Press the Online button.</p> <p>Does the Online light go out?</p> <p>YES: Go to step 3. NO: Go to page 3-1400-34, "Control Panel."</p>

Error Description	Diagnostic Action
1400 Printer Entry	<p>3. Press the Line Feed and Forms Feed buttons.</p> <p>Do the forms advance when each button is pressed?</p> <p>YES: Go to step 4.</p> <p>NO: Do the forms advance when either the Line Feed or the Forms Feed button is pressed?</p> <p>YES: Go to page 3-1400-34, "Control Panel."</p> <p>NO: Go to page 3-1400-22, "Forms Do Not Advance," and follow each step until the failing FRU is isolated.</p> <p>4. Remove all forms. Press the Online button.</p> <p>Does the alarm sound and the No Paper light go on?</p> <p>YES: Set the printer's Power switch to Off. Reload the forms. Set the printer's Power switch to On. Go to step 5.</p> <p>NO: Go to page 3-1400-34, "Control Panel."</p>

Error Description	Diagnostic Action
1400 Printer Entry	<p>Step 5 Continued.</p> <p>IBM Graphics Printer</p> <p>Character Set 1</p> <pre> ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 = : ; < = > @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 ; ; < = > ? @ A B C D E F G H I J K L M N O </pre> <p>IBM Graphics Printer</p> <p>Character Set 2</p> <pre> ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 = : ; < = > @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 ; ; < = > ? @ A B C D E F G H I J K L M N O </pre> <p>Did your printout match any sample?</p> <p>YES: Go to page 3-1400-9, "Failure Symptom." If a failure symptom still exists, proceed to the corresponding page and follow each step until the failing FRU is isolated.</p> <p>NO: Go to step 6.</p>

Error Description	Diagnostic Action
1400 Printer Entry	<p>6. Set the printer's Power switch and the system unit's Power switch to Off. Disconnect the Printer Cable from the printer and the system unit. Run the Offline Diagnostic Test (see page 3-1400-42).</p> <p>Does the printer print?</p> <p>NO: Go to page 3-1400-18, "No Printing," and follow each step until the failing FRU is isolated.</p> <p>YES: Compare the printout with these samples.</p> <p>IBM Matrix Printer</p>  <p>IBM Graphics Printer Character Set 1</p> 

Error Description	Diagnostic Action
1400 Printer Entry	<p>IBM Graphics Printer</p> <p>Character Set 2</p>  <p>Did your printout match any sample?</p> <p>YES: Go to step 7.</p> <p>NO: Go to page 3-1400-9, "Failure Symptom." If a failure symptom still exists, proceed to the corresponding page and follow each step until the failing FRU is isolated.</p> <p>7. Check the first line of the Offline Diagnostic Test printout.</p> <p>Does the printout begin like this?</p>  <p>Continued on the next page.</p>

Error Description	Diagnostic Action
1400 Printer Entry	<p>YES: Go to step 8.</p> <p>NO: The first line of the printout indicates that the printer defaults to a character set that does not support all of the international characters.</p> <p>Is the international character set required?</p> <p>YES: Remove the top cover, (see Section 5).</p> <p>Is position 7 of DIP switch 1 set to On? (see Section 4).</p> <p>YES: Replace the logic card.</p> <p>NO: Remove the plastic cover from DIP switch 1. Set position 7 to On. Install the plastic cover on the DIP switch. Install the printer top cover, then go to step 6.</p> <p>NO: Go to step 8.</p>

Error Description	Diagnostic Action
1400 Printer Entry	<p>8. Load the Advanced Diagnostics and set the Power switch on the expansion unit (if attached) and the system unit to On. Advance to diagnostic menu 4.</p> <p>Is option 9 missing?</p> <p>YES: Replace the printer adapter (see Section 5).</p> <p>NO: Run the diagnostic routines for the printer adapter.</p> <p>Did the diagnostics run error free?</p> <p>YES: Go to step 9.</p> <p>NO: Replace the printer adapter (see Section 5).</p> <p>9. Check all pins of the printer cable, pin to pin, for shorts or opens (see Section 4).</p> <p>Any shorts or opens?</p> <p>YES: Replace the printer cable.</p> <p>NO: Replace the control cards in the printer (see Section 5).</p>

Failure Symptom	Page
Power Supply	
220/240 Volt	3-1400-10
120 Volt	3-1400-12
Print Head	
No Printing	3-1400-18
Print head carriage not moving	3-1400-21
Forms	
Forms not advancing; overprinting	3-1400-22
Forms jamming or tearing	3-1400-23
Ribbon	
Ribbon jammed	3-1400-24
Print Quality	
Printing too light: poor print quality	3-1400-25
Smudged printing	3-1400-26
Uneven printing (characters or lines)	3-1400-26
Rows of print dots missing	3-1400-27
Random print dots missing	3-1400-27
Extra print dots	3-1400-29
Does not print international character set	3-1400-5
Printing continues beyond end-of-forms	3-1400-31
Doublespacing—abnormal characters	3-1400-31
False end-of-forms alarm	3-1400-32
Uneven horizontal spacing	3-1400-33
Control Panel	3-1400-34

Error Description	Diagnostic Action
Power Supply Check 220/240 Volt	<p>1. Set the printer Power switch to Off. Unplug the printer power cord from the outlet. Set the printer Power switch to On. Measure for 40 to 50 ohms between the voltage terminals on the power cord. DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>Is the resistance 40 to 50 ohms?</p> <p>YES: Go to step 3, page 3-1400-15. NO: Unplug the power cord from the printer. Measure for 40 to 50 ohms between the two lower pins of the AC socket on the rear of the printer.</p> <p>Is the resistance 40 to 50 ohms.</p> <p>YES: Replace the printer's power cord. NO: Check for an open fuse (see Section 4).</p> <p>Is the fuse open?</p> <p>Continued on the next page.</p>

Error Description	Diagnostic Action
Power Supply Check 220/240 Volt	<p>YES: Replace the fuse (see Section 5). Set the printer's Power switch to Off. Plug the printer's power cord into the printer and the outlet. Set the printer's Power switch to On for 1 minute.</p> <p>Does the fuse open?</p> <p>YES: Go to step 2, page 3-1400-14. NO: The problem has been resolved.</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>NO: Check for 40 to 50 ohms between the wires in positions 1 and 4 of the transformer-primary power connector (see Section 4).</p> <p>Is the resistance 40 to 50 ohms?</p> <p>YES: Replace the fuse-filter card (see Section 5). NO: Replace the power transformer (see Section 5).</p>

Error Description	Diagnostic Action
Power Supply Check 120 Volt	<p>1. Set the printer's Power switch to Off. Unplug the printer's power cord from the outlet. Set the printer's Power switch to On. Measure for 2 to 12 ohms between the voltage terminals on the Power cord.</p> <p>Is the resistance 2 to 12 ohms?</p> <p>YES: Go to step 3.</p> <p>NO: Check for an open fuse (see Section 4).</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>Is the fuse open?</p> <p>YES: Replace the fuse (see Section 5). Set the printer's Power switch to Off. Plug the printer's power cord into the outlet. Set the printer's Power switch to On for 1 minute.</p> <p>Does the fuse open?</p> <p>YES: Go to step 2.</p> <p>NO: The problem has been resolved.</p> <p>NO: Continue on the next page.</p>

Error Description	Diagnostic Action
Power Supply Check 120 Volt	<p>NO: Check for approximately 12 ohms on the primary side of the power transformer (see Section 4).</p> <p>Is the resistance approximately 12 ohms?</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>YES: Replace the fuse-filter card (see Section 5).</p> <p>NO: Replace the power transformer (see Section 5).</p>

Error Description	Diagnostic Action
Power Supply Check 120 Volt	<p>2. Set the printer's Power switch to Off. Unplug the printer's power cord from the outlet. Replace the fuse (see Section 5). Disconnect the power transformer connector from the fuse-filter card (see Section 4). Plug the printer's power cord into the outlet. Set the printer's Power switch to On for 1 minute then Off. Unplug the printer's power cord from the outlet and check for an open fuse.</p> <p>Is the fuse open?</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>YES: Replace the fuse-filter card (see Section 5).</p> <p>NO: Replace the power transformer (see Section 5).</p>

Error Description	Diagnostic Action																									
Power Supply Check 120 Volt	<p>3. Disconnect CN2 (see Section 4). Plug the printer's power cord into the outlet. Set the printer's Power switch to On. Measure the voltages on the plug side of CN2 (see the chart below).</p> <p>DANGER: Line voltages are present on the AC filter, circuit board, and the transformer. Caution should be exercised when measuring secondary voltages.</p> <table><tr><th>Color</th><th>+ Lead</th><th>- Lead</th><th>Min. Voltage</th><th>Max. Voltage</th></tr><tr><td>Gray</td><td>CN2-1</td><td>CN2-2</td><td>7.6 Vac</td><td>10.4 Vac</td></tr><tr><td>Orange</td><td>CN2-3</td><td>CN2-4</td><td>19.5 Vac</td><td>26.5 Vac</td></tr><tr><td>Red</td><td>CN2-5</td><td>CN2-6</td><td>8.1 Vac</td><td>10.9 Vac</td></tr><tr><td>Blue</td><td>CN2-7</td><td>CN2-8</td><td>13.0 Vac</td><td>17.6 Vac</td></tr></table> <p>Are the voltages within range?</p> <p>YES: Go to step 4.</p> <p>NO: Replace the power transformer (see Section 5).</p>	Color	+ Lead	- Lead	Min. Voltage	Max. Voltage	Gray	CN2-1	CN2-2	7.6 Vac	10.4 Vac	Orange	CN2-3	CN2-4	19.5 Vac	26.5 Vac	Red	CN2-5	CN2-6	8.1 Vac	10.9 Vac	Blue	CN2-7	CN2-8	13.0 Vac	17.6 Vac
Color	+ Lead	- Lead	Min. Voltage	Max. Voltage																						
Gray	CN2-1	CN2-2	7.6 Vac	10.4 Vac																						
Orange	CN2-3	CN2-4	19.5 Vac	26.5 Vac																						
Red	CN2-5	CN2-6	8.1 Vac	10.9 Vac																						
Blue	CN2-7	CN2-8	13.0 Vac	17.6 Vac																						

Error Description	Diagnostic Action									
Power Supply Check 120 Volt	<p>4. Set the printer's Power switch to Off. Connect CN2 (see Section 4). Set the printer's Power switch to On then measure the voltages at CN3, (see Section 4), as shown in the chart below. Use the ground pin on the driver circuit card.</p> <p>DANGER: Line voltage is present on the AC filter circuit board and transformer. Caution should be exercised when measuring DC voltages.</p> <table><tr><th>Pin No.</th><th>Min. Voltage</th><th>Max. Voltage</th></tr><tr><td>CN3-16</td><td>4.5 Vdc</td><td>5.5 Vdc</td></tr><tr><td>CN3-20</td><td>11.0 Vdc</td><td>15.4 Vdc</td></tr></table> <p>Are + 5 and + 14 Vdc within range?</p> <p>YES: Go to step 5.</p> <p>NO: Replace both control cards (see Section 5).</p>	Pin No.	Min. Voltage	Max. Voltage	CN3-16	4.5 Vdc	5.5 Vdc	CN3-20	11.0 Vdc	15.4 Vdc
Pin No.	Min. Voltage	Max. Voltage								
CN3-16	4.5 Vdc	5.5 Vdc								
CN3-20	11.0 Vdc	15.4 Vdc								

Error Description	Diagnostic Action						
Power Supply Check 120 Volt	<p>5. Measure the + 24 Vdc (use the ground pin on the driver circuit card).</p> <table><tr><th>Pin No.</th><th>Min. Voltage</th><th>Max. Voltage</th></tr><tr><td>CN3-18</td><td>21.6 Vdc</td><td>26.4 Vdc</td></tr></table> <p>Is + 24 Vdc present?</p> <p>YES: The power supply checks good. If you still have a problem go to page 3-1400-9, "Failure Symptom".</p> <p>NO: Go to step 6.</p> <p>6. Measure the DC voltages (on the 60-volt scale) at pins CN6-1 and CN6-2 of control circuit card (use the DC ground pin on the driver circuit card for the common lead). Subtract the lower reading from the higher.</p> <p>Is the difference 0.5 to 0.9 Vdc?</p> <p>YES: Replace both control cards (see Section 5).</p> <p>NO: Replace the heat sink/power transistor assembly (see Section 5).</p>	Pin No.	Min. Voltage	Max. Voltage	CN3-18	21.6 Vdc	26.4 Vdc
Pin No.	Min. Voltage	Max. Voltage					
CN3-18	21.6 Vdc	26.4 Vdc					

Error Description	Diagnostic Action
No Printing	<ol style="list-style-type: none"> 1. Does the print head carriage move back and forth normally when attempting to print? YES: Go to page 3-1400-27, "Row(s) of Print Dots Missing." NO: Go to step 2. 2. Set the printer's Power switch to Off. Check for a loose or broken carriage belt. Replace if broken, adjust if loose (see Section 5). 3. Remove the ribbon cartridge. Turn the knob on the cartridge to check for jamming. Replace it if it is jammed. 4. Check the print head for broken wires. Replace the print head if the wires are damaged (see Section 5). 5. Move the print head assembly and check for smooth mechanical movement. Is the movement smooth? YES: Go to step 6. NO: Check for worn or broken gears in the carriage drive assembly. Are any gears worn or broken? Continue on the next page.

Error Description	Diagnostic Action
No Printing	<p>YES: Replace the carriage drive assembly (see Section 5).</p> <p>NO: Replace the print mechanism assembly (see Section 5).</p> <p>6. Set the printer's Power switch to On. Move the print head to the leftmost position. Check for an Up level (approximately + 5 Vdc) to a Down level (approximately 0 Vdc) meter deflection at CN6-20 on the driver circuit card (see Section 4) while moving the print head to the center of the print line. Use the ground pin on the driver circuit card for the common lead. Is there an Up level to a Down level meter deflection.</p> <p>YES: Go to step 7.</p> <p>NO: Is there a constant Down level?</p> <p>YES: Go to page 3-1400-10, "Power Supply Check." Replace the left margin sensor if the power supply checks OK (see Section 5).</p> <p>NO: Continue on the next page.</p>

Error Description	Diagnostic Action
No Printing	<p>NO: Set the printer's Power switch to Off. Check continuity from CN6-20 (driver circuit card) to the left margin sensor terminal 1, and from CN6-15 to the left margin sensor terminal 2 (see Section 4).</p> <p>Is either line open?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Replace the left margin sensor (see Section 5).</p> <p>7. Check for a meter deflection from an Up level (approximately + 5 Vdc) to a Down level (approximately 0 Vdc) on pin CN6-19 on the driver circuit card (see Section 4) while applying slight left or right pressure to the print head to the next detented position. Use the driver circuit card ground pin for the common lead.</p> <p>Is there an Up level to a Down level meter deflection?</p> <p>YES: Go to step 8.</p> <p>NO: Is there a constant Up level?</p> <p>Continue on the next page.</p>

Error Description	Diagnostic Action
No Printing	<p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Check for + 5 Vdc at CN5-18 (see Section 4).</p> <p>Is there + 5 Vdc?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Go to page 3-1400-10, "Power Supply Check."</p> <p>8. Set the printer's Power switch to Off. Measure the resistance between pin CN6-13, (driver circuit card), and pins CN6-21, 22, 23 and 24 (stepper motor coils) on the cable end for a reading of approximately 45 ohms.</p> <p>Is the resistance approximately 45 ohms?</p> <p>YES: Replace the control card (see Section 5).</p> <p>NO: Replace the print mechanism assembly (see Section 5).</p>
Print Head Carriage Not Moving	Go to page 3-1400-18, "No Printing."

Error Description	Diagnostic Action
Forms Do Not Advance	<ol style="list-style-type: none"> 1. Check the position of the forms feeding into the printer. The forms path must be parallel to the printer sides. Reposition the forms for parallel feeding.
Overprinting	<ol style="list-style-type: none"> 2. Check the forms path for any obstructions (for example, jagged edges on the forms box, torn paper in the print mechanism). Remove any obstructions.
Forms Jamming Or Tearing	<ol style="list-style-type: none"> 3. Inspect the left and right forms tractors for: <ul style="list-style-type: none"> --Poor positioning --Loose covers --Loose lock levers --Worn springs --Broken feed pins <p>Replace the left or right forms tractors if they are damaged (see Section 5).</p> 4. Check for a loose or broken carriage belt. Check for broken cogs on the belt. Adjust if loose or replace if broken (see Section 5). 5. Inspect the print head for broken wires. Replace it if the wires are damaged (see Section 5). 6. Check the print-head gap adjustment. Adjust if out of tolerance (see Section 5).

Error Description	Diagnostic Action
Forms Do Not Advance	7. Check for a bent or pitted ribbon shield. Replace the shield if damaged (see Section 5).
Overprinting	8. Check for a damaged platen. Replace the print mechanism assembly if the platen is damaged (see Section 5).
Forms Jamming Or Tearing	<p>9. Set the printer's Power switch to Off. Advance the forms by turning the forms advance knob. Check the intermediate gear for worn or broken teeth and replace the gears if damaged. Check the left and right tractors for broken feedpins. Replace the tractors if the feedpins are broken (see Section 5).</p> <p>10. Check for 45 ohms resistance on the forms feed motor coils between pin CN6-14 and pins CN6-25, 26, 27 and 28 on the driver circuit card (see Section 4). Is the resistance 45 ohms?</p> <p>YES: Check for + 24 Vdc at CN3-18 (see Section 4).</p> <p>Is there + 24 Vdc?</p> <p>YES: Replace both control cards (see Section 5).</p> <p>NO: See page 3-1400-10, "Power Supply Check."</p> <p>NO: Replace the print mechanism assembly (see Section 5).</p>

Error Description	Diagnostic Action
Ribbon Jammed	<ol style="list-style-type: none"> <li data-bbox="344 177 908 347">1. Remove the ribbon cartridge. Try a print operation to verify that the print head carriage functions normally. If the carriage fails, see page 3-1400-18, "No Printing." <li data-bbox="344 392 908 496">2. Check the ribbon cartridge for binding by manually advancing the ribbon, replace it if it is binding. <li data-bbox="344 541 908 644">3. Visually check for worn or broken ribbon drive gears, replace the carriage drive assembly if damaged. (see Section 5). <li data-bbox="344 689 908 748">4. Check for a bent ribbon shield, replace it if necessary (see Section 5). <li data-bbox="344 793 908 922">5. Check the print head for broken or binding wires. Replace the print head if the wires are broken or binding (see Section 5).

Error Description	Diagnostic Action
<p>Printing Too Light</p> <p>Poor Print Quality</p>	<ol style="list-style-type: none"><li data-bbox="370 177 941 272">1. Check for adequate ink on the ribbon, or a damaged ribbon. Replace the cartridge if needed.<li data-bbox="370 320 941 416">2. Check the ribbon cartridge for binding by manually advancing the ribbon, replace it if it is binding.<li data-bbox="370 464 941 560">3. Visually check for worn or broken ribbon drive gears, replace the carriage drive assembly if it is damaged (see Section 5).<li data-bbox="370 608 941 671">4. Check for a bent ribbon shield and replace it if necessary (see Section 5).<li data-bbox="370 719 941 847">5. Check the print head for broken or binding wires. Replace the print head if wires are broken or binding (see Section 5).<li data-bbox="370 895 941 1023">6. Verify that the print-head gap is 0.6 to 0.65 mm (0.024 to 0.026 in.) with the lever in the center position (see Section 5).<li data-bbox="370 1070 941 1134">7. Check the print head for loose mounting (see Section 5).<li data-bbox="370 1182 941 1310">8. Check for a loose or damaged platen, print head carriage shafts, or print mechanism frame. Replace the print mechanism if needed (see Section 5).

Error Description	Diagnostic Action
Smudged Printing	<ol style="list-style-type: none"> 1. Check if the ribbon cartridge: <ul style="list-style-type: none"> --Is jammed --Is seated improperly --Has excessive ink --Is oily or dirty 2. Check for a dirty, oily, or damaged platen. Replace the print mechanism if the platen is damaged (see Section 5). 3. Check for a dirty print head and print wires. Clean it if it is dirty. 4. Check for a dirty or bent ribbon shield; replace the shield if it is damaged (see Section 5). 5. Visually check for worn or broken ribbon drive gears; replace the ribbon drive assembly if it is damaged (see Section 5).
Uneven Printing	<p>If there is uneven printing top/bottom of characters or left/right of print line and no adjustments will correct this, replace the print mechanism assembly (see Section 5).</p>

Error Description	Diagnostic Action
Rows of Print Dots Missing or Random Print Dots missing	<ol style="list-style-type: none"> 1. Check the ribbon for damage (folds, holes, tears). Replace the cartridge if it is damaged. 2. Verify that the print-head gap adjustment is between 0.6 to 0.65 mm (0.024 to 0.026 in.) at the center position of the adjusting lever (see Section 5). 3. Check for a damaged platen. Replace the print mechanism if the platen is damaged (see Section 5). 4. Check the print head for broken wires. If the wires are broken, replace the print head (see Section 5). 5. Remove CN6 on the driver circuit card (see Section 4). Measure approximately 22 ohms between pin CN6-10 (male side) and each head coil pin CN6-1 to 9 (male side). Is the resistance approximately 22 ohms? <p>Continue on the next page.</p>

Error Description	Diagnostic Action
Row(s) of Print Dots Missing or Random Print Dots Missing	<p>YES: Replace both control cards (see Section 5).</p> <p>NO: Disconnect the print-head cable and check the resistance of pins 1 through 9 on the print-head cable for approximately 22 ohms (see Section 4).</p> <p>Is the resistance approximately 22 ohms?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Replace the print head (see Section 5).</p>

Error Description	Diagnostic Action
Extra Print Dots	<p>1. Do "Offline Diagnostic Test" (see page 3-1400-42). Examine the / and Y characters for extra dots.</p> <p>2. Remove CN6 on the driver circuit card (see Section 4). Measure approximately 22 ohms between pin CN6-10 (male side) and each head coil pin CN6-1 to 9 (male side).</p> <p>Is the resistance approximately 22 ohms?</p> <p>YES: Go to step 3.</p> <p>NO: Disconnect the print-head cable and check pins 1 through 9 on the print-head cable for approximately 22 ohms with respect to common (see Section 4).</p> <p>Is the resistance approximately 22 ohms?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Replace the print head (see Section 5).</p>

Error Description	Diagnostic Action
Extra Print Dots	<p data-bbox="344 156 897 260">3. Measure the resistance between pins CN6-1 to 9 (see Section 4) with respect to every other pin.</p> <p data-bbox="387 300 779 331">Are any pins shorted together?</p> <p data-bbox="387 371 878 435">NO: Replace both control cards (see Section 5).</p> <p data-bbox="387 443 908 547">YES: Disconnect the print-head cable and recheck pins CN6-1 to 9 with respect to every other pin.</p> <p data-bbox="474 587 866 619">Are any pins shorted together?</p> <p data-bbox="474 659 889 754">YES: Replace the print mechanism assembly (see Section 5).</p> <p data-bbox="474 762 911 826">NO: Replace the print head (see Section 5).</p>

Error Description	Diagnostic Action
Printing Continues beyond End-of-forms	<ol style="list-style-type: none"> <li data-bbox="367 162 938 402">1. Set the printer's Power switch to Off. Check the continuity of the end-of-forms switch from pin CN6-18 on the driver circuit card (see Section 4) to the ground pin on the driver circuit card (open when the forms are inserted, and shorted when the forms are removed). Replace the print mechanism assembly if the switch fails (see Section 5). <li data-bbox="367 555 920 721">2. Check for + 5 Vdc at CN6-18 on the driver circuit card (see Section 4) with the forms inserted. Check the power supply if it is 0 Vdc. Use the ground pin on the driver card.
Double-spacing or Abnormal Characters	Replace both control cards (see Section 5).

Error Description	Diagnostic Action
False End-of- Forms Alarm	<p>1. Is the No Paper light off?</p> <p>YES: Go to step 2.</p> <p>NO: Are the forms inserted properly?</p> <p>YES: Go to page 3-1400-31, "Printing Continues beyond End-of-Forms."</p> <p>NO: Insert the forms properly.</p> <p>2. Set the printer Power switch to Off, then to On.</p> <p>Is the alarm still sounding?</p> <p>YES: Measure for + 10.5 to + 12.5 Vdc on pin 1 of the control panel (see Section 4).</p> <p>Is the voltage approximately +12 Vdc?</p> <p>YES: Replace both control cards (see Section 5).</p> <p>NO: Replace the control panel (see Section 5).</p> <p>NO: Run the Offline Diagnostic Test, (see page 3-1400-42).</p> <p>Does the alarm sound?</p> <p>YES: Replace the print mechanism (see Section 5).</p> <p>NO: Go to page 3-1400-1, "Printer Entry" if a printer failure is still suspected.</p>

Error Description	Diagnostic Action
Uneven Horizontal Spacing	<ol style="list-style-type: none"><li data-bbox="368 161 938 264">1. Check for a loose print-head carriage belt, and adjust the belt tension if needed (see Section 5).<li data-bbox="368 301 916 368">2. Check for a loosely mounted print head (see Section 5).<li data-bbox="368 405 927 510">3. Check for worn gears in the carriage drive assembly and replace the assembly if needed (see Section 5).<li data-bbox="368 547 945 652">4. Check for bent or binding carriage shafts; replace the print mechanism if needed (see Section 5).

Error Description	Diagnostic Action												
Control Panel	<div>1. Set the printer's Power switch to On. Measure the voltages at CN3 as shown in the chart below. Use ground on the driver circuit card.</div> <table><tr><th>Pin No.</th><th>Min. Voltage</th><th>Max. Voltage</th></tr><tr><td>CN3-16</td><td>4.5 Vdc</td><td>5.5 Vdc</td></tr><tr><td>CN3-20</td><td>11.0 Vdc</td><td>15.4 Vdc</td></tr><tr><td>CN3-18</td><td>21.6 Vdc</td><td>26.4 Vdc</td></tr></table> <div>Are all voltages correct?</div> <div>YES: Go to step 2.</div> <div>NO: Go to page 3-1400-10, "Power Supply Check."</div> <div>2. Set the printer's Power switch to Off. Disconnect the printer cable at the printer. Insert the forms and set the printer's Power switch to On.</div> <div>Are the Power, Ready, and Online lights on?</div> <div>YES: Go to step 6.</div> <div>NO: Is the alarm sounding and is the No Paper light on?</div> <div>YES: Go to page 3-1400-32, "False End-of-Forms Alarm."</div> <div>NO: Go to step 3.</div>	Pin No.	Min. Voltage	Max. Voltage	CN3-16	4.5 Vdc	5.5 Vdc	CN3-20	11.0 Vdc	15.4 Vdc	CN3-18	21.6 Vdc	26.4 Vdc
Pin No.	Min. Voltage	Max. Voltage											
CN3-16	4.5 Vdc	5.5 Vdc											
CN3-20	11.0 Vdc	15.4 Vdc											
CN3-18	21.6 Vdc	26.4 Vdc											
Continued on the next page.													

Error Description	Diagnostic Action
Control Panel	<p data-bbox="365 172 687 204">3. Is the Power light on?</p> <p data-bbox="409 244 665 276">YES: Go to step 4.</p> <p data-bbox="409 280 913 416">NO: Measure for approximately + 10 Vdc to + 12 Vdc at pin 9 on the control panel. Use pin 8 for ground (see Section 4).</p> <p data-bbox="499 456 844 520">Is approximately + 12 Vdc present?</p> <p data-bbox="499 560 913 624">YES: Replace the control panel (see Section 5).</p> <p data-bbox="499 632 891 695">NO: Go to page 3-1400-10, "Power Supply Check."</p> <p data-bbox="365 735 695 767">4. Is the Online light on?</p> <p data-bbox="409 807 665 839">YES: Go to step 5.</p> <p data-bbox="409 844 930 1015">NO: Measure for approximately + 10 to + 12 Vdc at pin 1 on the control panel. Use the ground pin on the driver circuit card (see Section 4).</p> <p data-bbox="499 1054 844 1118">Is approximately +12 Vdc present?</p> <p data-bbox="499 1158 936 1222">YES: Replace both control cards (see Section 5).</p> <p data-bbox="499 1230 919 1294">NO: Replace the control panel (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p>5. Is the Ready light on?</p> <p>YES: Go to step 6.</p> <p>NO: Measure for approximately + 12 Vdc at pin 4 on the control panel. Use the ground pin on the driver circuit card for the ground lead (see Section 4).</p> <p>Is approximately + 12 Vdc present?</p> <p>YES: Replace the control cards (see Section 5).</p> <p>NO: Replace the control panel (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p>6. Set the printer's Power switch to Off. Insert the forms under the end-of-forms switch. Set the printer's Power switch to On. Press the Online button.</p> <p>Is the Online light off?</p> <p>YES: Go to step 7. NO: Measure for approximately + 4.0 to + 5.5 Vdc on Pin 5 of the control panel. Use pin 8 for ground (see Section 4).</p> <p>Is approximately + 5 Vdc present?</p> <p>NO: Replace both control cards (see Section 5). YES: Press and hold the Online button. Measure 0 to + 1.5 Vdc on Pin 5 of the control panel.</p> <p>Is approximately + 1.5 Vdc present?</p> <p>YES: Replace both control cards (see Section 5). NO: Replace the control panel (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p data-bbox="356 156 754 188">7. Press the Line Feed button.</p> <p data-bbox="400 228 804 260">Do the forms advance one line?</p> <p data-bbox="400 300 654 331">YES: Go to step 8.</p> <p data-bbox="400 336 916 475">NO: Measure for approximately + 4.0 to + 5.5 Vdc on Pin 7 of the control panel. Use Pin 8 for ground (see Section 4).</p> <p data-bbox="490 515 934 547">Is approximately + 5 Vdc present?</p> <p data-bbox="490 587 922 651">NO: Replace both control cards (see Section 5).</p> <p data-bbox="490 655 927 794">YES: Press and hold the Line Feed button. Measure 0 to + 1.5 Vdc on Pin 7 of the control panel.</p> <p data-bbox="580 834 934 898">Is approximately + 1.5 Vdc present?</p> <p data-bbox="580 938 938 1034">YES: Replace both control cards (see Section 5).</p> <p data-bbox="580 1038 918 1145">NO: Replace the control panel (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p>8. Press the Forms Feed button.</p> <p>Do the forms advance?</p> <p>YES: Go to step 9.</p> <p>NO: Measure for approximately + 4.0 to + 5.5 Vdc on Pin 6 of the control panel. Use Pin 8 for ground (see Section 4).</p> <p>Is approximately + 5 Vdc present?</p> <p>NO: Replace both control cards (see Section 5).</p> <p>YES: Press and hold the Forms Feed button. Measure 0 to + 1.5 Vdc on Pin 6 of the control panel.</p> <p>Is approximately + 1.5 Vdc present?</p> <p>YES: Replace both control cards (see Section 5).</p> <p>NO: Replace the control panel (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p data-bbox="342 177 841 240">9. Remove the forms from the printer. Press the Online button.</p> <p data-bbox="385 284 676 312">Does the alarm sound?</p> <p data-bbox="385 355 658 384">YES: Go to step 10.</p> <p data-bbox="385 389 880 528">NO: Measure for approximately + 5 Vdc from pin CN6-18 on the driver circuit card to the ground pin on the driver circuit card.</p> <p data-bbox="474 568 919 596">Is approximately + 5 Vdc present?</p> <p data-bbox="474 639 891 735">YES: Replace the print mechanism assembly (see Section 5).</p> <p data-bbox="474 740 919 1054">NO: Measure for a voltage pulsing from 0 to + 12 Vdc at Pin 10 of the control panel. Use Pin 8 for ground. Set the printer Power switch to Off and then On before taking the voltage reading. It will pulse only eight times.</p> <p data-bbox="568 1094 913 1158">Does the voltage pulse 0 to + 12 Vdc?</p> <p data-bbox="568 1198 908 1294">YES: Replace the control panel (see Section 5).</p> <p data-bbox="568 1299 908 1394">NO: Replace the control cards (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p data-bbox="378 153 844 185">10. Does the No Paper light go On?</p> <p data-bbox="435 225 904 325">YES: The control panel checks OK. Return to page 3-1400-1, "Printer Entry".</p> <p data-bbox="435 331 941 432">NO: Measure for approximately + 10 to + 12 Vdc at Pin 3 of the control panel.</p> <p data-bbox="525 472 871 541">Is approximately + 12 Vdc present?</p> <p data-bbox="525 580 889 644">YES: Replace both control cards (see Section 5).</p> <p data-bbox="525 651 941 715">NO: Replace the control panel (see Section 5).</p>

Offline Diagnostic Test Description

An offline diagnostic test can be run to verify correct operation of the printer mechanism (motors, ribbon drive, printhead, and others) and print quality. A sample of the ripple patterns is shown below.

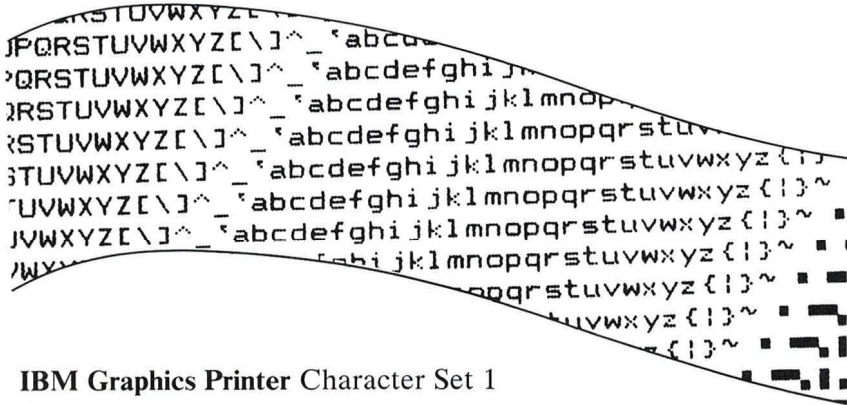
Operating Procedure

Press and hold the Line Feed button while you set the printer Power switch to On.

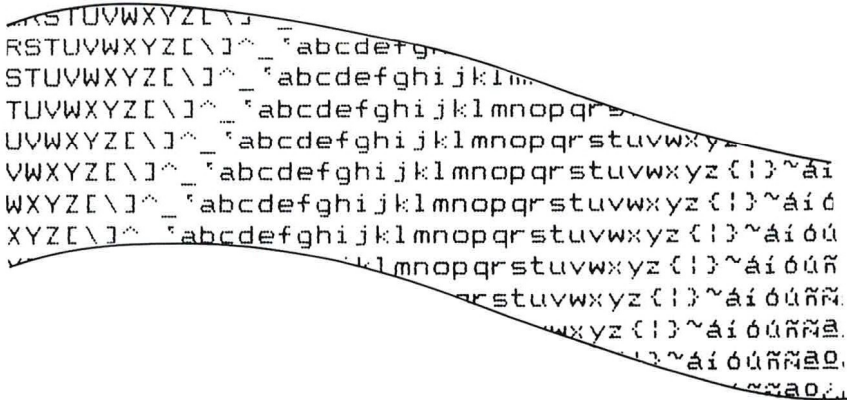
Note: This test takes up to 10 minutes.

To stop the test before it is completed, set the printer Power to Off.

IBM Matrix Printer



IBM Graphics Printer Character Set 1



Notes:



Synchronous Data Link Control Adapter

You have entered this PIC because you have a **15XX** error code or have identified a problem with the Synchronous Data Link Control (SDLC) Communications Adapter.

SDLC

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Insert your Advanced Diagnostics diskette in drive A.
3. If the expansion unit is attached, set its Power switch to On.
4. Set the system unit's Power switch to On. If an error occurs at this time, press F1 to continue.
5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
7. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
8. Press 0 (**RUN TESTS ONE TIME**), then press Enter.

CONTINUE



1. Select 15 (**SDLC COMMUNICATIONS ADAPTER**), then press Enter.
2. Press Y or N (**IS AN IBM COMMUNICATIONS CABLE ATTACHED?**), then press Enter.

The screen should now instruct you to install the wrap plug on either the SDLC Communications Adapter or the IBM Communications Adapter Cable.

TESTING — SDLC COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE SDLC ADAPTER? (Y/N) y**

**DISCONNECT THE CABLE AT THE MODEM AND
INSTALL THE WRAP PLUG ON THE END OF
THE CABLE.**

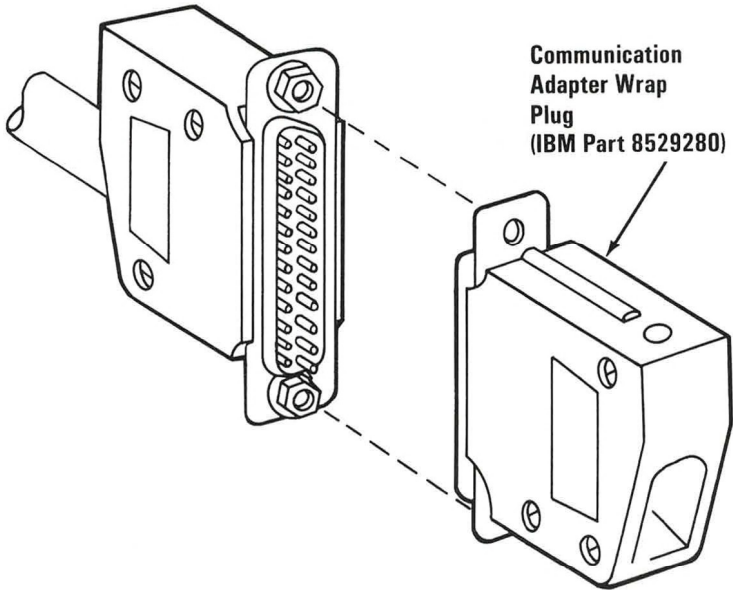
PRESS ENTER WHEN READY 

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-1500-4.

YES 

1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
 2. Press Enter to begin the test. The test may take up to 15 seconds.
-



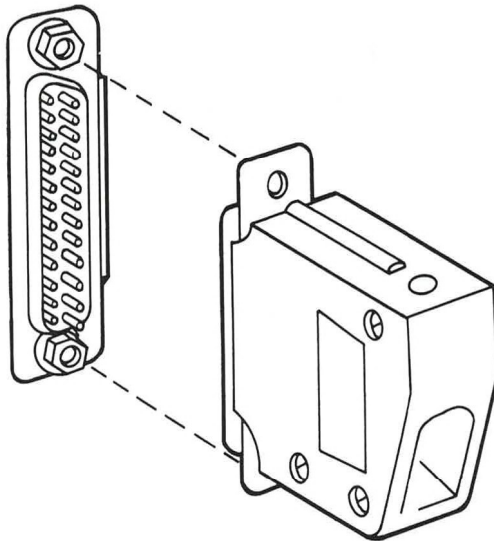
**DOES THE MESSAGE ON YOUR SCREEN
INSTRUCT YOU TO INSTALL THE WRAP PLUG
ON THE SDLC ADAPTER?**

NO Your Synchronous Data Link Control (SDLC) Communications Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

YES



1. Remove the communications cable (if attached) from the SDLC adapter.
 2. Refer to the figure below and install the wrap plug on the SDLC adapter.
 3. Press Enter to begin the test. The test may take up to 15 seconds.
-



DID THE TEST RUN WITHOUT AN ERROR?

- NO** If the error message instructs you to replace the cable or SDLC adapter, do so (see Section 5).
- YES** Your Synchronous Data Link Control (SDLC) Communications Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Fixed Disk Drive

You have entered this PIC because you have a **17XX** error code, have identified a fixed disk drive problem, or want to format the fixed disk drive.


WARNING

Normal shipping and handling can result in permanent loss of all data and formatting on the fixed disk drives. We recommend that you copy all files onto diskettes.

Note: Be sure the terminating resistor is installed in the correct fixed disk drive. (The terminating resistor is a 14-pin logic block in a socket close to the rear of the printed circuit board.)

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Insert your Advanced Diagnostics diskette into drive A.
3. Set the Power switch on the expansion unit (if attached) and the system unit to On.

CONTINUE

- 
4. After the diskette loads, press **0 (RUN DIAGNOSTIC ROUTINES)** then press Enter.
 5. Verify that the installed devices are shown on the list. If any devices are missing from the list, follow the instructions on the display to try to add the missing items. Even if you cannot correct the list, you must answer yes to continue.
 6. When the **SYSTEM CHECKOUT** menu appears, select **0 (RUN TESTS ONE TIME)** then press Enter.
 7. The following is displayed:
-



1 - S SYSTEM BOARD
18 - S EXPANSION OPTION
2 - S 128KB MEMORY
3 - S KEYBOARD
4 - S MONOCHROME & PRINTER ADAPTER
6 - S 1 DISKETTE DRIVE(S) & ADAPTER
9 - S PRINTER ADAPTER
11 - S ASYNC COMMUNICATIONS ADAPTER
17 - E 2 FIXED DISK DRIVE(S) & ADAPTER
14 - S MATRIX PRINTER

ENTER THE NUMBER(S) OF OPTIONS TO TEST
OR PRESS ENTER TO SELECT ALL OPTIONS

CONTINUE

Select 17 (**FIXED DISK DRIVE(S) AND ADAPTER**) then press Enter. The Fixed Disk Adapter is then tested. If the test ends without an error, the following is displayed:

TESTING – FIXED DISK DRIVE(S) & ADAPTER

- 0 – RUN FIXED DISK TEST
- 1 – RUN MEASUREMENTS TEST
- 2 – FORMAT FIXED DISK
- 9 – EXIT FIXED DISK TESTS


ENTER THE ACTION DESIRED? 

Fixed Disk

DID THE TEST FINISH WITHOUT AN ERROR?

NO Replace the Fixed Disk Adapter (see Section 5).

YES 



If your system has only one fixed disk drive, go to page 3-1700-6.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.

Skip Step 2 if this PIC has instructed you to do the diagnostic tests again.

2. See Section 5, and disconnect the data connector (J3) and the control connector (J1) from fixed disk drive D (see Section 4).
3. Set the Power switch on the expansion unit (if attached) and system unit to On.
4. After the diskette loads, press **0 (RUN DIAGNOSTIC ROUTINES)** then press Enter.
5. Verify that the installed devices are shown on the list. If any devices are missing from the list, follow the instructions on the display to try to add the missing items. Even if you cannot correct the list, you must answer Yes to continue.

CONTINUE



6. Press **0 (RUN TESTS ONE TIME)** then press Enter.

7. Select **17 (FIXED DISK DRIVE(S) AND ADAPTER)** then press Enter.

The following is displayed:


TESTING – FIXED DISK DRIVE(S) & ADAPTER

- 0 – RUN FIXED DISK TEST**
- 1 – RUN MEASUREMENTS TEST**
- 2 – FORMAT FIXED DISK**
- 9 – EXIT FIXED DISK TESTS**

ENTER THE ACTION DESIRED? 

Fixed Disk

CONTINUE

- 
1. Press **0 (RUN FIXED DISK TEST)** then press Enter.
 2. When **ENTER DRIVE ID (C/D)** appears, press **C** (for drive C) then press Enter.
 3. When **DO YOU WANT TO INCLUDE FIXED DISK WRITE TESTS ON DRIVE C (Y/N)?** appears, press **Y** or **N**, then press Enter.
-
-
-

CONTINUE



The following is displayed:

PERFORMING SEEK TEST
PERFORMING WRITE TEST
PERFORMING TRACK ZERO TEST
PERFORMING SURFACE SCAN
PLEASE STAND BY

0 – RUN FIXED DISK TEST
1 – RUN MEASUREMENTS TEST
2 – FORMAT FIXED DISK
9 – EXIT FIXED DISK TESTS

ENTER THE ACTION DESIRED? 

Fixed Disk

DID THE ABOVE APPEAR WITHOUT AN ERROR CODE?

- NO** If the error prompt is **REPLACE DRIVE C** go to page 3-1700-17 and format drive C. If the error prompt is **CHECK DRIVE C: AND ADAPTER**, go to page 3-1700-10 to check drive C.
- YES** If drive D is disconnected, go to page 3-1700-8 to check drive D. If you have only one fixed disk drive, go to page 3-1700-11 to check drive C.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.

Note: Skip Step 2 if this PIC has instructed you to do the diagnostic tests again.

2. Connect J1 and J3 to drive D.
 3. Set the Power switch on the expansion unit (if attached) and system unit to On.
 4. After the diskette loads, press **0 (RUN DIAGNOSTIC ROUTINES)** then press Enter.
 5. Verify that the installed devices are shown on the list. If any devices are missing from the list, follow the instructions on the display to try to add the missing items. Even if you cannot correct the list, you must answer yes to continue.
-
-

CONTINUE



6. Press **0** (**RUN TESTS ONE TIME**) then press Enter.

7. Select **17** (**FIXED DISK DRIVE(S) AND ADAPTER**) then press Enter.

The following is displayed:


TESTING – FIXED DISK DRIVE(S) & ADAPTER

- 0 – RUN FIXED DISK TEST**
- 1 – RUN MEASUREMENTS TEST**
- 2 – FORMAT FIXED DISK**
- 9 – EXIT FIXED DISK TESTS**

ENTER THE ACTION DESIRED? 

Fixed Disk

CONTINUE

- 
1. Press **0 (RUN FIXED DISK TESTS)** then press Enter.
 2. When **ENTER DRIVE ID (C/D)** appears, press **D** (for drive D) then press Enter.
 3. When **DO YOU WANT TO INCLUDE FIXED DISK WRITE TESTS ON DRIVE D (Y/N)?** appears, press **Y** or **N** then press Enter.

The following is displayed:

PERFORMING SEEK TEST
PERFORMING WRITE TEST
PERFORMING TRACK ZERO TEST
PERFORMING SURFACE SCAN
PLEASE STAND BY

0 – RUN FIXED DISK TEST
1 – RUN MEASUREMENTS TEST
2 – FORMAT FIXED DISK
9 – EXIT FIXED DISK TESTS

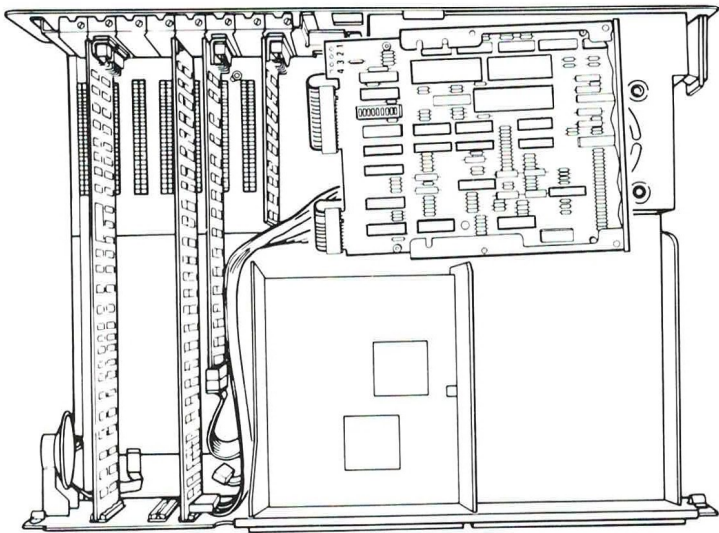
ENTER THE ACTION DESIRED? 

DID THE ABOVE APPEAR WITHOUT AN ERROR CODE?

NO If the error prompt is **REPLACE DRIVE D** go to page 3-1700-17 and format drive D. If the error prompt is **CHECK DRIVE D: AND ADAPTER**, continue with the next page.

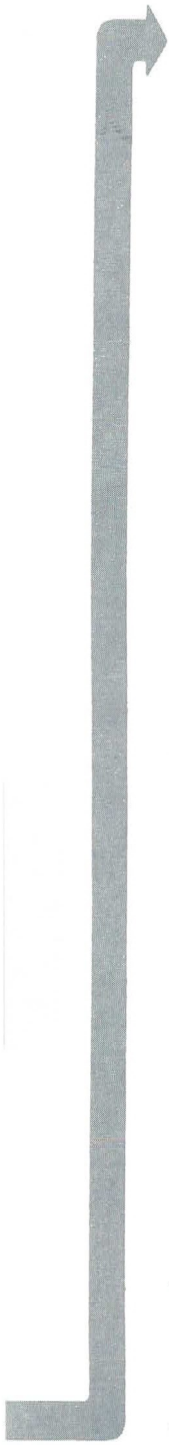
YES 

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Remove the failing fixed disk drive from either the system unit or the expansion unit (see Section 5).
3. Set the fixed disk drive on the power supply cover so the logic board faces up and the face plate faces the right side of the unit, see the figure below.
4. Connect all cables.



Fixed Disk

CONTINUE

- 
1. Insert your Advanced Diagnostics diskette into drive A.
 2. Set the Power switch on the expansion unit (if attached) and system unit to On.
 3. After the diskette loads, press **0 (RUN DIAGNOSTIC ROUTINES)** then press Enter.
 4. Verify that item 17 is shown in the installed devices list. If item 17 is missing from the list, follow the instructions on the display to add item 17 (fixed disk drive). Even if you cannot correct the list, you must answer yes to continue.
 5. When the **SYSTEM CHECKOUT** menu appears, press **0 (RUN TESTS ONE TIME)** then press Enter.

The following is displayed:




```
1 - S SYSTEM BOARD
18 - S EXPANSION OPTION
2 - S 128KB MEMORY
3 - S KEYBOARD
4 - S MONOCHROME & PRINTER ADAPTER
5 - S COLOR/GRAPHICS MONITOR ADAPTER
6 - S 1 DISKETTE DRIVE(S) AND ADAPTER
9 - S PRINTER ADAPTER
11 - S ASYNC COMMUNICATIONS ADAPTER
12 - S ALT ASYNC COMMUNICATIONS ADPT
13 - S GAME CONTROL ADAPTER
15 - S SDLC COMMUNICATIONS ADAPTER
17 - S 1 FIXED DISK DRIVE(S) AND ADAPTER
14 - S MATRIX PRINTER
```

IS THE LIST CORRECT (Y/N)? - / -

CONTINUE

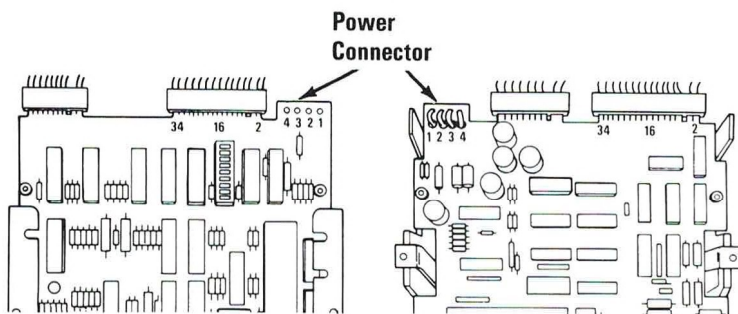


- 
1. Select **17 (FIXED DISK DRIVE(S) AND ADAPTER)** then press Enter.
 2. Press **1 (RUN MEASUREMENTS TEST)** then press Enter.
 3. When **ENTER DRIVE ID (C/D)?** appears, press **C** or **D**, then press Enter.

Note: On the next page are examples of the fixed disk logic board and connectors. These may not be exactly like the ones in your machine; however, certain items will be the same.

- J1, the control connector, will have 34 pins.
- J2, the data connector, will have 22 pins.
- The Power connector will have any one or more of the following:
 - Numbering on the plug.
 - Numbering on the board.
 - The male plug will have a ridge on the outside of the plug that is toward pin 1.
 - Pin 1 may have a square solder land.

4. Measurement Test 1 is now running. Measure the voltages at the power connector lands for the values shown in the table below. Do not press any keys on the keyboard until you are instructed to do so by the PIC.



TEST DESCRIPTION	FIXED DISK	RESPONSE
Measurement Test 1	+ Lead Power 4 - Lead Power 3	+ 5.2 to 4.8 Vdc
	+ Lead Power 1 - Lead Power 2	+ 12.6 to 11.5 Vdc

TABLE P

ARE THE VOLTAGES CORRECT?

NO Go to page 3-020-1, "Power."

YES

With Measurement Test 1 still running, measure the voltages on the failing drive for the high or low readings specified in the tables below.

Note: The negative lead should be attached to frame ground unless otherwise noted.

TEST DESCRIPTION	FIXED DISK	RESPONSE
Measurement Test 1	J1-2	0.1 Vdc to 0.5 Vdc (Low)
	J1-4	0.1 Vdc to 0.5 Vdc (Low)
	J1-14	0.1 Vdc to 0.5 Vdc (Low)
	J1-18	0.1 Vdc to 0.5 Vdc (Low)
	J1-26	0.1 Vdc to 0.5 Vdc (Low)

TABLE A

TEST DESCRIPTION	FIXED DISK	RESPONSE
Measurement Test 1	J1-8	0.1 Vdc to 0.5 Vdc (Low)
	J1-10	0.1 Vdc to 0.5 Vdc (Low)
	J1-12	2.5 Vdc to 3.0 Vdc (High)
	J1-22	0.1 Vdc to 0.5 Vdc (Low)

TABLE B

ARE THE VOLTAGES CORRECT AS SPECIFIED?

NO If any of the voltage measurements from Table A are incorrect, check the fixed disk cable for continuity. If the cable is OK, replace the Fixed Disk Adapter.

If any of the voltage measurements from Table B are incorrect, go to page 3-1700-17 and format the failing fixed disk drive. If any of the voltage measurements from Tables A and B are incorrect, replace the Fixed Disk Adapter (see Section 5).

YES

1. Press the spacebar once. **MEASUREMENT TEST 2 RUNNING** appears on your screen. Do not press another key or the spacebar until instructed to do so by the PIC.
2. Measure the voltages for the high or low readings specified in the tables below.

Note: The negative lead should be attached to frame ground unless otherwise noted.

TEST DESCRIPTION	FIXED DISK	RESPONSE
Measurement Test 2	J1-24	0.1 Vdc to 0.5 Vdc (Low)
	J1-26	0.1 Vdc to 0.5 Vdc (Low)
	J1-34	0.1 Vdc to 0.5 Vdc (Low)

TABLE C

TEST DESCRIPTION	FIXED DISK	RESPONSE
Measurement Test 2	J1-10	2.5 Vdc to 3.0 Vdc (High)
	J1-12	2.5 Vdc to 3.0 Vdc (High)

TABLE D

ARE THE VOLTAGES CORRECT AS SPECIFIED?

NO If any of the voltage measurements from Table C are incorrect, check the fixed disk cable for continuity. If the cable is OK, replace the Fixed Disk Adapter.

If any of the voltage measurements from Table D are incorrect, go to page 3-1700-17 and format the failing fixed disk drive. If any of the voltages in Tables C and D are incorrect, replace the Fixed Disk Adapter (see Section 5).

YES

1. Press the spacebar once. **MEASUREMENT TEST 3 RUNNING** appears on your screen. Do not press another key or the spacebar until you complete the measurement test.
2. Measure the voltages for the high or low readings specified in the tables below.

Note: The negative lead should be attached to frame ground unless otherwise noted.

TEST DESCRIPTION	FIXED DISK	RESPONSE
Measurement Test 3	J1-6	0.1 Vdc to 0.5 Vdc (Low)

TABLE E

TEST DESCRIPTION	FIXED DISK	RESPONSE
Measurement Test 3	J1-12	2.5 Vdc to 3.0 Vdc (High)

TABLE F

ARE THE VOLTAGES CORRECT AS SPECIFIED?

NO If the voltage measurement from Table E is incorrect, check the fixed disk cable for continuity. If the cable is OK, replace the Fixed Disk Adapter.

If the voltage measurement from Table F is incorrect, go to page 3-1700-18 and format the failing fixed disk drive. If both voltages in Tables E and F are incorrect, replace the fixed disk adapter (see Section 5).

YES Go to page 3-1700-21.

You have entered this page because you have identified a failing fixed disk drive. Before replacing a drive, you should first try to format that drive, then run the diagnostic tests. Because all data on the fixed disk drive is destroyed during formatting, this should be the very last step taken before replacing a drive. After you format a fixed disk drive, the lost data can be loaded from the backup diskette.


To Format a Fixed Disk Drive

CAUTION: All data on the fixed disk drive will be destroyed during formatting. Before loading data from backup diskettes, refer to the DOS manual for a description of the FDISK, FORMAT, BACKUP and RESTORE commands.

1. Set the Power switch on the system unit to Off.
2. Install the fixed disk drives and connect any data and control connectors that were disconnected while testing.
3. Insert your Advanced Diagnostics diskette into drive A.
4. Set the Power switch on the expansion unit and system unit to On.
5. After the diskette loads, press **0 (RUN DIAGNOSTIC ROUTINES)** then press Enter.

CONTINUE



- 
6. Verify that the installed devices are shown on the installed devices list. If any devices are missing from the list, follow the instructions on the display to try to add the missing items. Even if you cannot correct the list, you must still answer yes to continue.
 7. When the **SYSTEM CHECKOUT** menu appears, press **0 (RUN TEST ONE TIME)** then press Enter.
 8. Select **17 (FIXED DISK DRIVE(S) AND ADAPTER)** then press Enter.

The following is displayed:

TESTING – FIXED DISK DRIVE(S) & ADAPTER

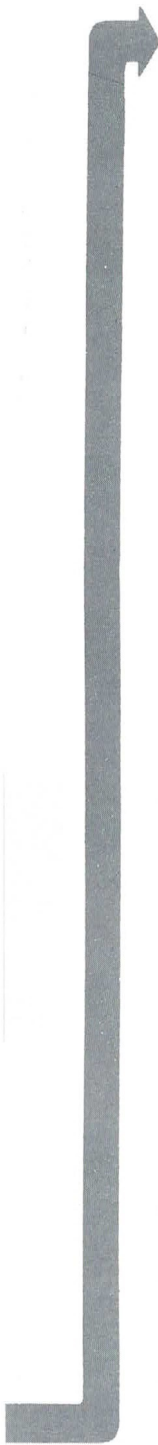
- 0 – RUN FIXED DISK TEST**
- 1 – RUN MEASUREMENTS TEST**
- 2 – FORMAT FIXED DISK**
- 9 – EXIT FIXED DISK TESTS**

ENTER THE ACTION DESIRED? -⚡-

Fixed Disk

CONTINUE



- 
9. Press **2 (FORMAT FIXED DISK)** then press Enter.
 10. When **ENTER DRIVE ID C/D** appears, press C or D (depending on which drive you want to format) then press Enter.
 11. When **ARE YOU SURE YOU WANT TO CONTINUE(Y/N)** appears, press Y then press Enter.
 12. When formatting is complete, go to page 3-1700-1 and run the fixed disk diagnostic tests. Then return to this page and answer the question below.
-

DID THE ERROR REMAIN AFTER FORMATTING?

- NO** The problem has been corrected and the backup data can be loaded from diskette.
- YES** Replace the fixed disk drive that failed (see Section 5).

You have gone through the PICs without solving your problem. The following steps should help you find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
 2. Return to page 3-3 and review "Start."
 3. Select "UTILITIES" in the diagnostic menu, start an error log, and select "RUN TESTS MULTIPLE TIMES". This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to page 3-3, "Start", or the appropriate PIC for the symptom you received.
-

If you have followed these procedures and still have an unsolved problem, request technical assistance.

Notes:



Expansion Unit

You have entered this PIC because you were unable to complete the POST, you have an **18XX** error code, or you suspect the expansion unit is failing. Make sure all cables are connected securely.

1. Set the Power switch on the system unit and expansion unit to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On. If an error occurs at this time, press the F1 key to continue.
 4. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 5. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 6. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 7. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
-

CONTINUE



Select 18 (**EXPANSION OPTION**), then press Enter.

You may receive an error message similar to the one below.

TESTING – EXPANSION OPTION

X:XX:XX

ERROR – EXPANSION OPTION

18XX S

Data – XXXX = XX/XX

SW = X

PRESS ENTER TO CONTINUE



DID YOU GET AN **18XX ERROR CODE SIMILAR TO THE ONE ABOVE?**

NO Your expansion unit has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

YES

In the figure below, find the error code you received.
Then go to the page listed.

Error Code	Page
1810.....	3-1800-4
1811.....	3-1800-4
1812.....	3-1800-4
1813.....	3-1800-4
1814.....	3-1800-4
1815.....	3-1800-4
1816.....	3-1800-4
1817.....	3-1800-4
1818.....	3-1800-4
1819.....	3-1800-16
1820.....	3-1800-6
1821.....	3-1800-6

1. Set the Power switch on the system unit and the expansion unit to Off.
2. Disconnect the expansion cable at the system unit.
3. Insert your Advanced Diagnostics diskette in drive A.
4. Set the system unit's Power switch to On. If an error occurs at this time, press the F1 key to continue.
5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
7. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
8. Press 0 (**RUN TESTS ONE TIME**), then press Enter.

CONTINUE



Select 18 (**EXPANSION OPTION**), then press Enter.

TESTING – EXPANSION OPTION

X:XX:XX

ERROR – EXPANSION OPTION 1820 E

Data – XXXX = XX/XX SW = X

PRESS ENTER TO CONTINUE

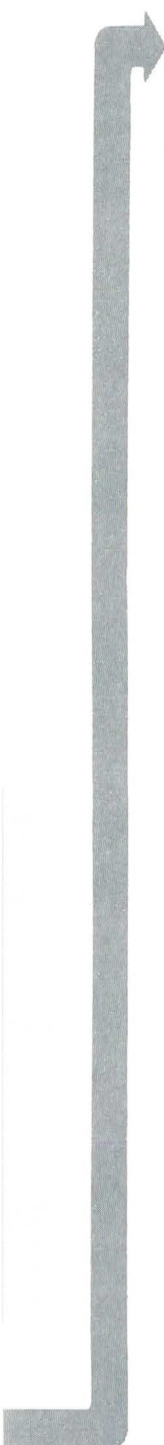
? 

Expansion Unit

DID YOU GET AN 1820 ERROR CODE?

NO Replace the extender card (see Section 5).

YES 

- 
1. Set the Power switch on the system unit and expansion unit to Off.
 2. Connect the expansion cable at the system unit, if it was removed in an earlier step.
 3. Remove all option adapters except the receiver card from the expansion unit, (see Section 5).
 4. Insert your Advanced Diagnostics diskette in drive A.
 5. Set the system unit's Power switch to On. If an error occurs at this time, press the F1 key to continue.
 6. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 7. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
 8. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 9. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
-

CONTINUE



Select 18 (**EXPANSION OPTION**), then press Enter.

TESTING – EXPANSION OPTION

X:XX:XX

ERROR – EXPANSION OPTION

18XX S

Data – XXXX = XX/XX

SW = X

PRESS ENTER TO CONTINUE

? 

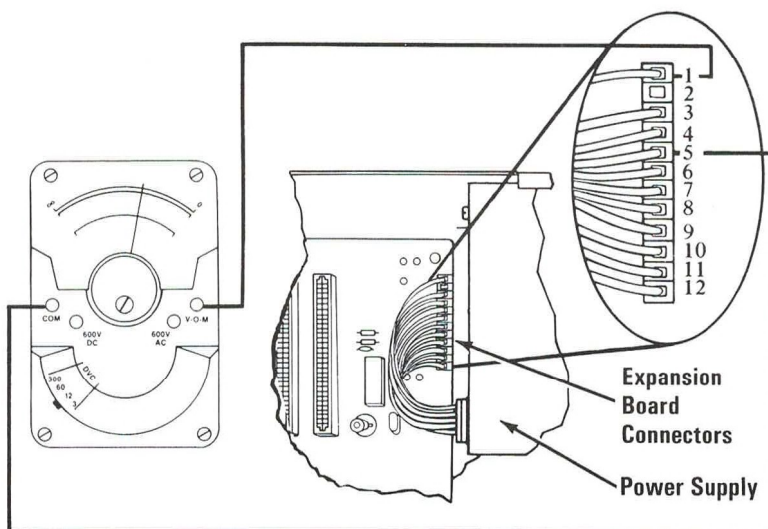
DID YOU GET AN 18XX ERROR CODE?

NO Go to page 3-1800-14.

YES 

1. Set your multimeter to the 12-Vdc scale.
2. Check the expansion-board power connector for the voltages listed in the table.

Voltage Connectors			
Min Vdc	Max Vdc	- Lead	+ Lead
2.4	5.2	5	1
4.8	5.2	5	10

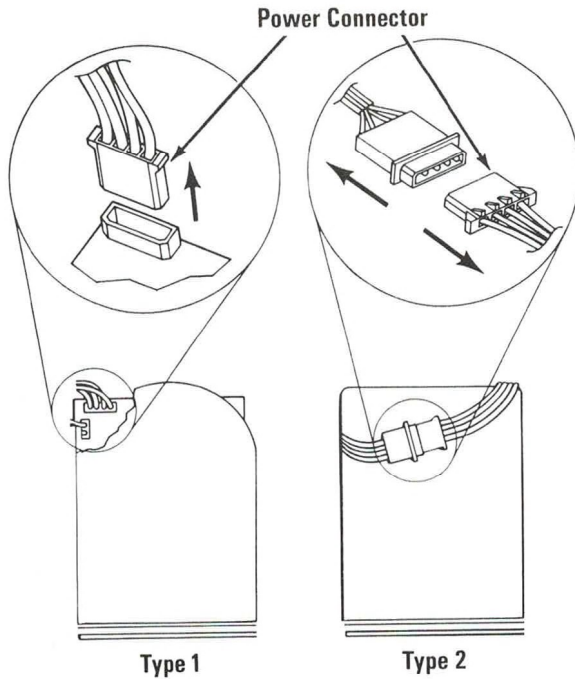


ARE THE VOLTAGES WITHIN THE CORRECT RANGES?

YES Replace the receiver card (see Section 5).

NO

1. Set the Power switch on the system unit and the expansion unit to Off.
 2. Remove the power connector from fixed disk drive C.
 3. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On.
-



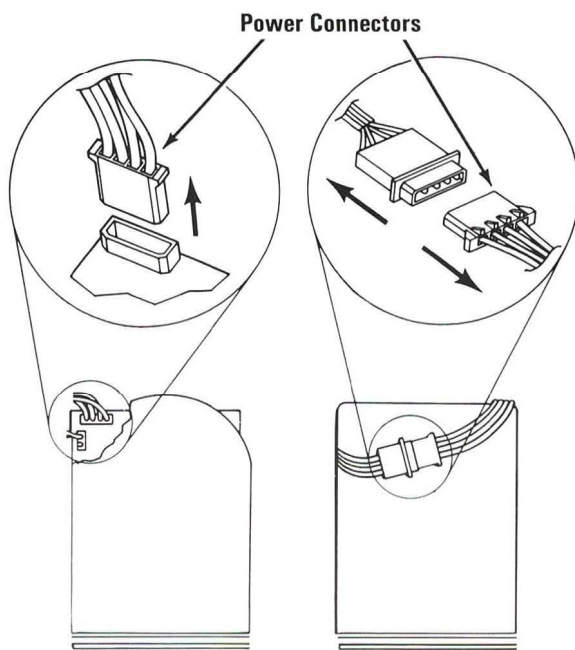
DID THE SYMPTOM REMAIN?

NO Replace fixed disk drive C (see Section 5).

YES

If you have only one fixed disk drive, go to page 3-1800-11. Otherwise, continue.

1. Set the Power switch on the system unit and expansion unit to Off.
 2. Remove the power connector from fixed disk drive D.
 3. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On.
-



DID THE SYMPTOM REMAIN?

NO Replace fixed disk drive D (see Section 5).

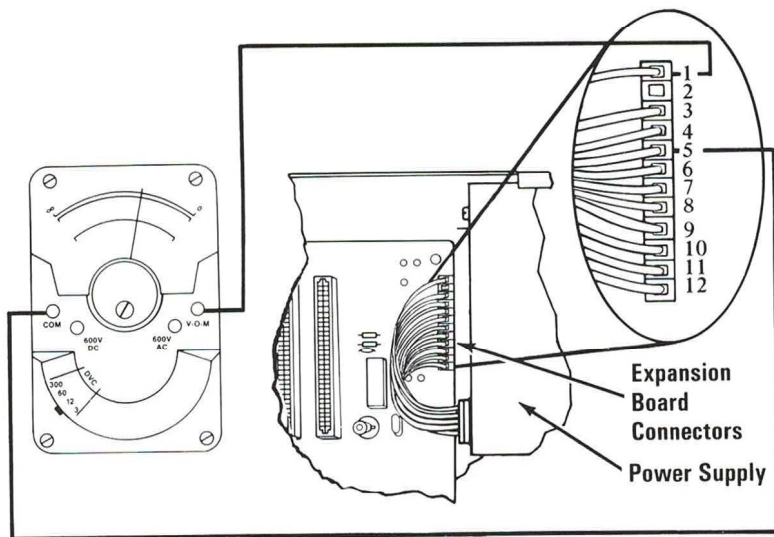
YES



Check the remaining power-supply output voltages to the expansion board.

1. Set your multimeter to the 12-Vdc scale.
2. Check the expansion-board power connector for the voltages listed in the table.

Voltage Connectors			
Min Vdc	Max Vdc	- Lead	+ Lead
4.5	5.4	9	6
11.5	12.6	7	3
10.8	12.9	4	8



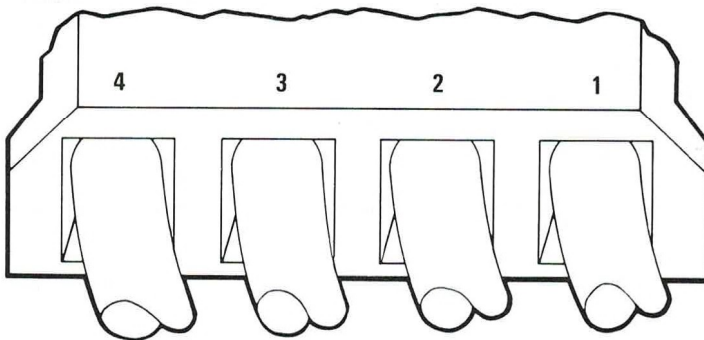
ARE THE VOLTAGES WITHIN THE CORRECT RANGES?

NO Replace the expansion unit's power supply (see Section 5).

YES

1. Set the Power switch on the system unit and expansion unit to Off.
2. Reconnect the power-supply connectors for the fixed disk drive.
3. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On.
4. Refer to the figure below and measure the voltages readings at the power-supply voltage connector for the fixed disk drive. The same voltages apply to both fixed disk drives if two drives are installed in the expansion unit.

Fixed Disk Drive Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
4.8	5.2	2	4
11.5	12.6	3	1



ARE THE VOLTAGES WITHIN THE CORRECT RANGES?

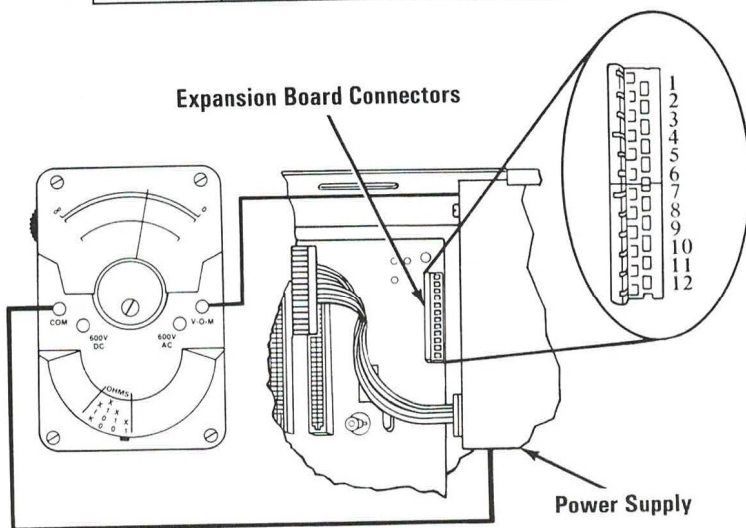
NO Replace the expansion unit's power supply (see Section 5).

YES



1. Set the Power switch on the system unit and the expansion unit to Off.
2. Set your multimeter to the Ohms x 1 scale.
3. Remove all option adapters (including the receiver card) from the expansion slots in the expansion unit.
4. Remove the expansion-board power connectors and measure the resistances of the expansion-board pins (see the table below).

- Lead	5	6	7	8	8	8
+ Lead	3	4	9	10	11	12
Minimum Resistance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms



ARE ANY OF THE RESISTANCES BELOW THE MINIMUM SHOWN IN THE TABLE?

NO Replace the expansion unit's power supply (see Section 5).

YES Replace the expansion board (see Section 5).

One of the option adapters in the expansion unit may be failing.

1. Set the Power switch on the system unit and the expansion unit to Off.
2. Reinstall one option adapter.
3. Insert your Advanced Diagnostics diskette in drive A.
4. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On. If an error occurs at this time, press the F1 key to continue.
5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
7. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
8. Press 0 (**RUN TESTS ONE TIME**), then Enter.

CONTINUE



Select 18 (**EXPANSION OPTION**), then press Enter.

TESTING – EXPANSION OPTION

X:XX:XX

ERROR – EXPANSION OPTION

18XX S

Data – XXXX = XX/XX

SW = X

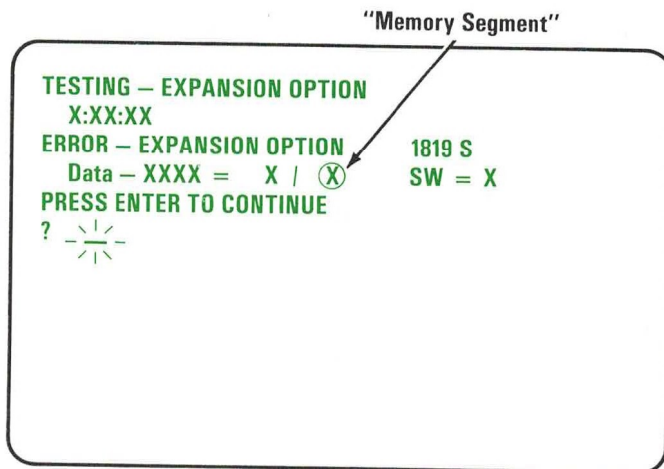
PRESS ENTER TO CONTINUE

? 

DID YOU GET AN 18XX ERROR CODE?

- NO** Repeat the seven steps on the preceding page and the step on this page until you find the failing option adapter.
- YES** Replace the option adapter you just installed in the expansion board (see Section 5).

Your screen will look similar to the one shown below.
Check that the switch settings on the extender card
correctly reflect the "Memory Segment", (see
Section 6 "Extender Card Switch Settings").



**DO THE EXTENDER CARD SWITCHES
CORRECTLY REFLECT THE "MEMORY
SEGMENT"?**

NO Set the extender card switches to reflect the
correct "Memory Segment."

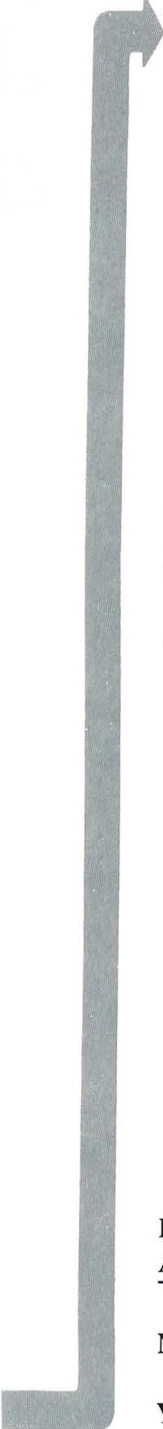
YES Replace the extender card (see Section 5).

Binary Synchronous Communications Adapter

You have entered this PIC because you have a **20XX** error code or have identified a problem with the Binary Synchronous Communications (BSC) Adapter.

1. Ensure the jumpers are set correctly on the BSC adapter (see Section 4).
2. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
3. Insert your Advanced Diagnostics diskette into drive A.
4. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On.
5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.

CONTINUE

- 
1. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 2. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
 3. Select 20 (**BSC ADAPTER**), then press Enter.
 4. Press Y or N (**IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE BSC ADAPTER (Y/N)?**), then press Enter.

The screen should now instruct you to install the wrap plug on either the BSC Adapter or the IBM Communications Adapter Cable.

**TESTING – BSC ADAPTER
IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE BSC ADAPTER? (Y/N)?**

Y

**DISCONNECT THE CABLE AT THE MODEM AND
INSTALL THE WRAP PLUG ON THE END OF
THE CABLE.
PRESS ENTER WHEN READY.**

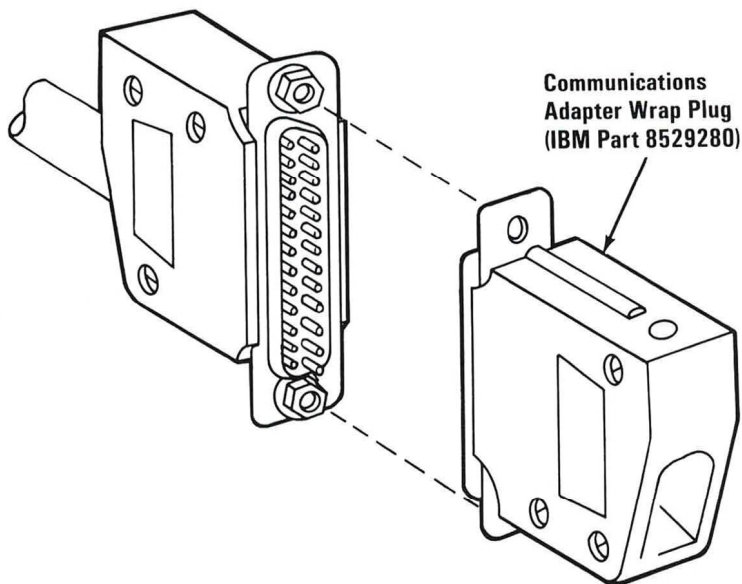
?

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-2000-5.

YES 

1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
 2. Press Enter to begin the test. The test may take up to 15 seconds.
-

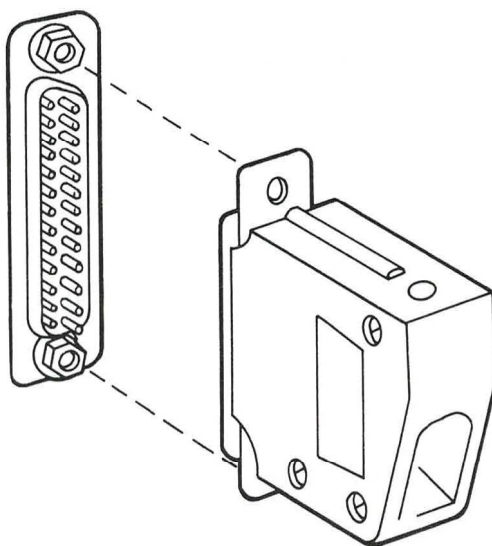


**DOES THE MESSAGE ON YOUR SCREEN
INSTRUCT YOU TO MOVE THE WRAP PLUG
FROM THE END OF THE CABLE TO THE
CONNECTOR ON THE BSC ADAPTER?**

NO Go to page 3-2000-5.

YES 

1. Remove the communications cable (if attached) from the BSC Adapter.
 2. Refer to the figure below and install the wrap plug on the BSC Adapter.
 3. Press Enter to begin the test. This test takes up to 15 seconds.
-



DID THE TEST RUN WITHOUT AN ERROR?

NO If the error message instructs you to replace the cable, the BSC Adapter, do so (see Section 5).

YES Your BSC adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

You may have an error message similar to the one shown below.

X:XX:XX
ERROR – BSC ADAPTER 20XX X
REPLACE THE BSC ADAPTER.

DID THE TEST RUN WITHOUT AN ERROR?

NO Replace the BSC Adapter (see Section 5).

YES Your BSC Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Notes:




Alternate Binary Synchronous Communications Adapter

You have entered this PIC because you have a **21XX** error code or have identified a problem with alternate Binary Synchronous Communications (BSC) Adapter.

1. Ensure the jumpers are set correctly on the BSC and alternate BSC Adapters and that you do not have an SDLC Communications Adapter installed (see Section 4).
 2. Set the Power switch on the system unit and expansion unit to Off.
 3. Insert your Advanced Diagnostics diskette in drive A.
 4. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On.
 5. Press 0 (**RUN DIAGNOSTIC ROUTINES**), then press Enter.
 6. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
-

CONTINUE



- 
1. Press Y or N (**IS THE LIST CORRECT (Y/N)?**), then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)
 2. Press 0 (**RUN TESTS ONE TIME**), then press Enter.
 3. Select 21 (**ALT BSC ADAPTER**), then press Enter.
 4. Press Y or N (**IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE ALT BSC ADAPTER (Y/N)?**), then press Enter.

The screen should now instruct you to install the wrap plug on either the alternate BSC Adapter or the IBM Communications Adapter Cable.

**TESTING – ALT BSC ADAPTER
IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT BSC ADAPTER (Y/N)?
Y**

**DISCONNECT THE CABLE AT THE MODEM AND
INSTALL THE WRAP PLUG ON THE END OF
THE CABLE.
PRESS ENTER WHEN READY.**

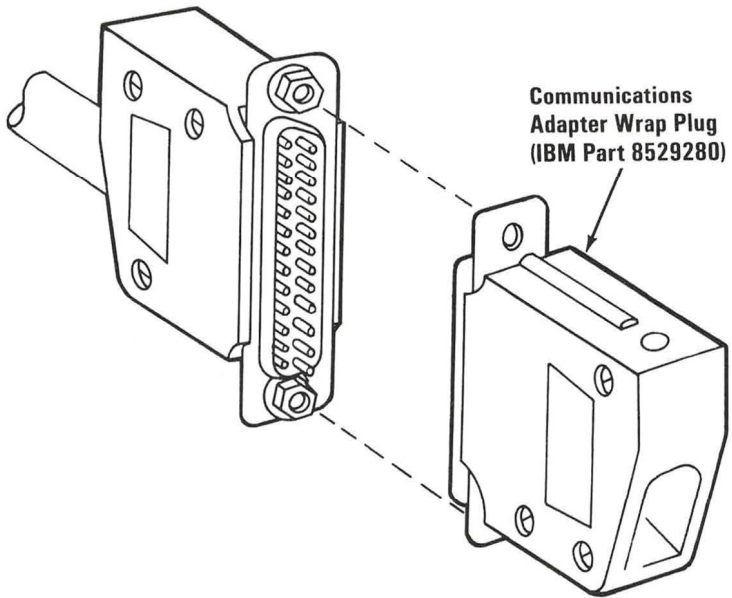
? 

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-2100-5.

YES 

1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
 2. Press Enter to begin the test. The test may take up to 15 seconds.
-

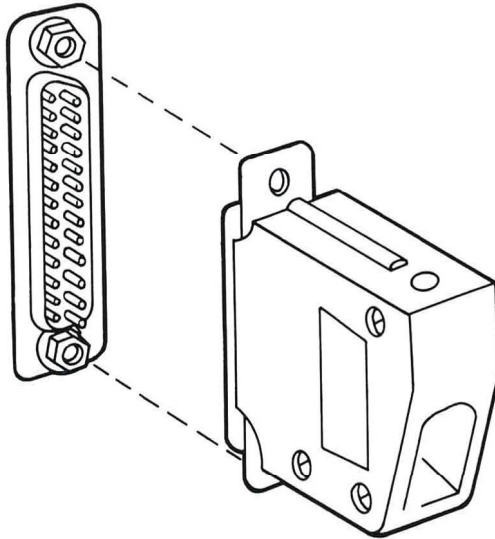


**DOES THE MESSAGE ON YOUR SCREEN
INSTRUCT YOU TO MOVE THE WRAP PLUG
FROM THE END OF THE CABLE TO THE
CONNECTOR ON THE ALT BSC ADAPTER?**

NO Go to page 3-2100-5.

YES 

1. Remove the communications cable (if attached) from the alternate BSC Adapter.
 2. Refer to the figure below and install the wrap plug on the alternate BSC Adapter.
 3. Press Enter to begin the test. This test takes up to 15 seconds.
-



DID THE TEST RUN WITHOUT AN ERROR?

- NO** If the error message directs you to replace the cable or alternate BSC Adapter, do so (see Section 5).
- YES** Your alternate BSC Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

You may have an error message similar to the one below.

Alt. Bismich

X:XX:XX
ERROR — ALT BSC ADAPTER 21XX X
REPLACE THE ALT BSC ADAPTER.

DID THE TEST RUN WITHOUT AN ERROR MESSAGE?

NO Replace the BSC Adapter.

YES Your alternate BSC Adapter has successfully passed the diagnostic tests. If you suspect an intermittent problem, go to page 3-010-10 and follow the PIC.

Notes:

Cluster Adapter

You have entered this PIC because you have a **22XX** error code or have identified a problem with a Cluster Adapter.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Ensure that the switches are set correctly on the Cluster Adapter (see Section 6).

Note: Before removing an Cluster Adapter, make a note of the unit and the slot in which the adapter is installed.

3. Insert your Advanced Diagnostics diskette in drive A.
4. Set the Power switch on the system unit (and expansion unit, if attached) to On.

The following is displayed.


```
THE IBM PERSONAL COMPUTER
ADVANCED DIAGNOSTICS
VERSION 2.05 (C) COPYRIGHT IBM CORP 1981, 1983

SELECT AN OPTION

0 - RUN DIAGNOSTIC ROUTINES
1 - FORMAT DISKETTE
2 - COPY DISKETTE
3 - PREPARE SYSTEM FOR RELOCATION
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED
? 0
```

CONTINUE



Do the following:

1. Press 0 (**RUN DIAGNOSTIC ROUTINES**) then press Enter.
2. Depending on the configuration of your system, the screen may ask questions about attached devices. Press Y or N as required, and then press Enter.
3. Press Y or N (**IS THE LIST CORRECT (Y/N)?**) then press Enter. If your list is not correct, follow the instructions on your screen and correct the list before answering Y.
4. Press 0 (**RUN TESTS ONE TIME**) then press Enter.
5. Select 22 (**Cluster Adapter**) then press Enter.

The follow is displayed.

TESTING – X CLUSTER ADAPTER(S)

- 1 – TEST CLUSTER ADAPTER**
- 2 – DISPLAY CLUSTER STATUS**
- 9 – EXIT CLUSTER ADAPTER TESTS**

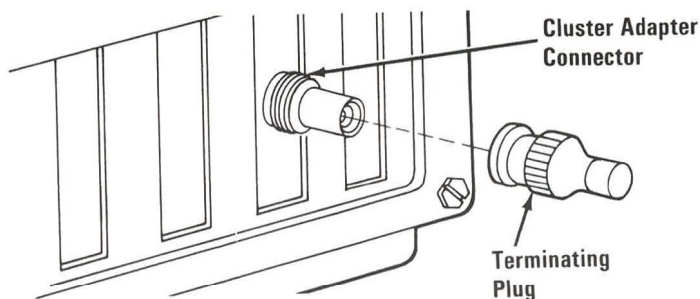
ENTER NUMBER OF ACTION DESIRED?

CONTINUE




Do the following steps:

1. Press 1 (**TEST CLUSTER ADAPTER**) then press Enter.
2. If more than one adapter is installed, (**SELECT THE ADAPTER NUMBER TO TEST**), then press Enter.
3. Press Y or N (**IS A CABLE CONNECTED TO THE CLUSTER ADAPTER (Y/N)?**) then press Enter.
4. The screen presentation will now instruct you to remove the coaxial cable (if attached) from the adapter.
5. To remove the coaxial cable (if attached), turn the coaxial cable connector counterclockwise and move it away from the Cluster Adapter connector.
6. When instructed to do so, connect the terminating plug (IBM P/N 6320352) to the Cluster Adapter connector (see the figure below).
7. Press Enter.



CONNECT THE TERMINATING PLUG TO THE CLUSTER ADAPTER.

CONTINUE



You may have an error message similar to the one below.

Note: If the test ended successfully, the Cluster Adapter test menu appears on the screen.



```
0:02:51
ERROR —
XS/XE CLUSTER ADAPTER(S)  22XX  X
ADAPTER SELECT SET INCORRECTLY

PRESS ENTER TO CONTINUE
?
```

DID THE TEST RUN WITHOUT AN ERROR MESSAGE?

- NO** More than one adapter number switch is set on the same adapter, and no other adapter has this address. See Section 6 and correct any switch setting errors. If all of the switch settings are correct, replace the failing Cluster Adapter.

YES



You may have an error message similar to the one below.

X:XX:XX
ERROR —
XS/XE CLUSTER ADAPTER(S) 22XX
REPLACE CLUSTER ADAPTER X
PRESS ENTER TO CONTINUE
?

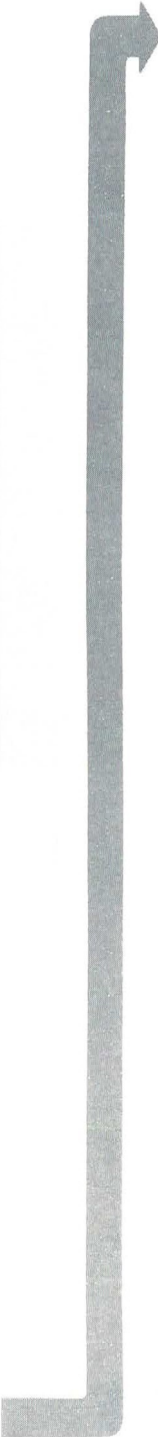
Cluster Adapter

DID THE TEST RUN WITHOUT AN ERROR MESSAGE?

Note: If the test ended successfully, the Cluster Adapter test menu appears on the screen.

NO Replace the Cluster Adapter (see Section 5).

YES



If you want to test the Cluster Adapter card further, go to page 3-2200-3.

DO YOU WANT TO DISPLAY THE CLUSTER STATUS?

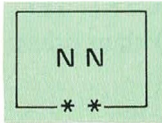
NO Press 9 and then press Enter. Go to page 3-2200-14.

YES

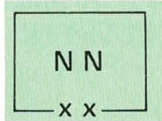


The following information explains the Cluster Status that appears on your screen.

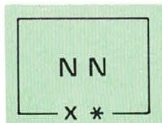
NN is any station address from 0 to 63.



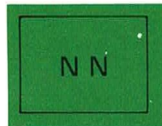
The system you are using is indicated on the screen in blinking reverse video, and the box is marked by two asterisks.



Stations in the Cluster that have the Power switch set to On, are displayed in reverse video and their boxes are marked by two X's.



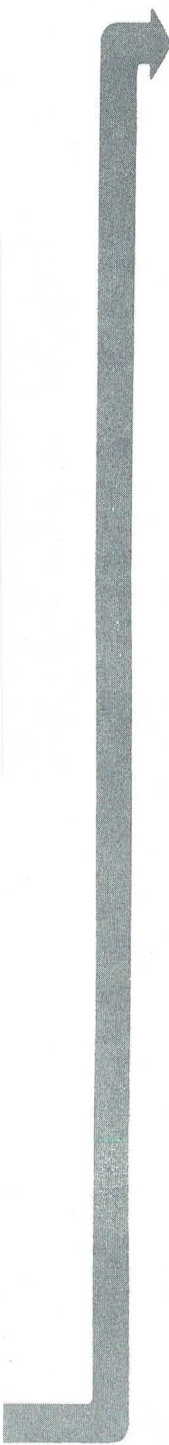
If another Personal Computer has the same station address as your Personal Computer, a long beep is sounded every 3 seconds and the box is displayed in blinking reverse video and is marked by an X and an asterisk.



A station address not on the Cluster is indicated by a box displayed in normal video and not marked with X's or asterisks.

A CLUSTER ACCESS ERROR message may be displayed in reverse video.

CONTINUE



Follow the steps below to run the Cluster Status.

1. Press 2 (**DISPLAY CLUSTER STATUS**) then press Enter.
 2. Press Y or N (**IS A CABLE CONNECTED TO THE CLUSTER ADAPTER (Y/N)?**) then press Enter.
 3. If a cable is not connected to the Cluster Adapter (**CONNECT THE CABLE TO THE CLUSTER ADAPTER**), then press Enter.
-

TESTING – X CLUSTER ADAPTER(S)

1 – TEST CLUSTER ADAPTER

2 – DISPLAY CLUSTER STATUS

9 – EXIT CLUSTER ADAPTER TESTS

ENTER NUMBER OF ACTION DESIRED? 2

**ENTER NUMBER OF CLUSTER
ADAPTER TO TEST (X-X) ? X**

**IS A CABLE CONNECTED TO THE
CLUSTER ADAPTER (Y/N)? n**

**CONNECT THE CABLE TO THE
CLUSTER ADAPTER**

**PRESS ENTER WHEN READY
?**

CONTINUE



Wait 15 seconds.

The Cluster Status screen presentation will show 64 boxes that represent the stations in the Cluster that have the Power switch set to On and are connected to the main coaxial bus.

0	1	2 X X	3 X X	4 X X	5 X X	6 X X	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63						

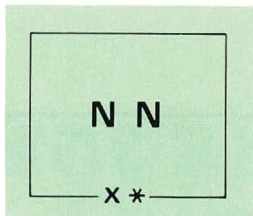
CLUSTER STATUS FOR ADAPTER X
PRESS ANY KEY TO EXIT

**DO ALL STATIONS INSTALLED IN THE CLUSTER
APPEAR AND REMAIN ON THE SCREEN
PRESENTATION?**

YES Your Cluster is operating properly. Press any key to end the diagnostics and go to page 3-2200-14.

NO

You may have an error similar to the one below (a box marked in blinking reverse video with an X and asterisk, with a beep sounding every 3 seconds).



DID YOU RECEIVE THE ERROR AS DESCRIBED ABOVE?

YES Another Personal Computer has the same station address as your Personal Computer. Use your Cluster map and compare it with the status screen presentation. Run the Diagnostic tests on a Personal Computer that is missing from the Cluster Status screen.

See Section 6 and correct any switch setting errors. If all of the switch settings are correct, replace the failing Cluster Adapter.

NO

You may have a error similar to the one below (a box displayed in normal video, not marked with X's or asterisks, for a station address that is in the Cluster).

Note: Multiple grounds on the Cluster cables may cause stations to appear on the status screen presentation intermittently. Contact your Installation Manger.



DID YOU RECEIVE THE ERROR DESCRIBED ABOVE?

YES Go to page 3-2200-13.

NO 



You have a Cluster Access Error.


X:XX:XX
ERROR —
X CLUSTER ADAPTER(S) 22XX X
CLUSTER ACCESS ERROR

PRESS ENTER TO CONTINUE
?

**DID YOU RECEIVE THE ERROR DESCRIBED
ABOVE?**

NO Go to page 3-2200-14.

YES 



You have a Cluster Access Error, or the Cluster map indicates station addresses on the Cluster, but not displayed on the Cluster Status screen. Do the following:

1. Run the Diagnostic tests on a station that has a Cluster Access Error, or is not indicated on any status screen.
 2. If the Diagnostic tests fails, replace the failing adapter.
 3. If the Diagnostic tests pass, continue doing the Diagnostic tests until all of the stations that either had an access error or did not appear on any status screen presentation.
 4. If the Cluster Adapters check good and the stations had an Cluster Access Error or did not appear on the Cluster Status screen presentations, contact your Installation Manager as the coaxial cable or a terminating plug is suspect.
-

You have gone through the PIC without solving your problem. The following steps should help you find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Go to page 3-010-1, "Undetermined Problem".
3. Select "**Log Utilities**" in the diagnostic menu, start an error log, and select "**RUN TESTS MULTIPLE TIMES**". This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to the PIC for that symptom.

If you have followed these procedures and still have an unresolved problem, you should seek technical assistance.

Compact Printer

You have entered this PIC because you have a **33XX** error or have identified an IBM PC Compact Printer problem. If your printer has visible obstructions or broken parts, remove the obstructions or replace the appropriate FRU.

Note: Before beginning this PIC, you must first successfully complete the Asynchronous Communications Adapter PIC.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
 2. Set the printer's Power switch to Off.
 3. Check to see that forms are properly loaded.
 4. Press and hold the Paper Feed button while setting the printer Power switch to On. (This starts the Printer Self Test. To end the test, set the printer Power switch to Off.)
-

DOES THE COMPACT PRINTER BEGIN TO PRINT?

NO Go to page 3-3300-10.

YES



Compare the printout with the one below.

[illegible]

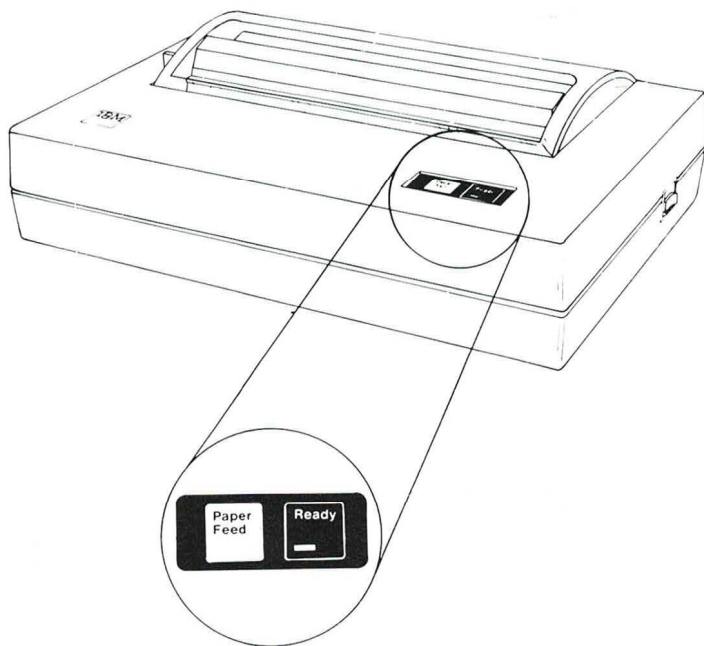
DOES THE PRINTOUT MATCH WITHOUT ANY ERRORS?

NO Go to the Failure Symptom Table on page 3-3300-20.

YES

Set the printer's Power switch to On, if the Self Test was ended before this step.

Observe the control panel.





Compact Printer

IS THE READY LIGHT ON?

NO Go to page 3-3300-9.

YES

- 
1. Set the printer's Power switch to Off to end the Printer Self Test.
 2. Ensure that the printer and the connector adapter are properly attached to the primary Asynchronous Communications Adapter in the system (or expansion) unit.
 3. Ensure that the Power switch on the system unit (and expansion unit, if attached) is Off.
 4. Load the Advanced Diagnostics diskette into drive A.
 5. Set the Power switch on the system unit (and expansion unit, if attached) to On.
 6. Set the printer's Power switch to On.
- 
-

CONTINUE





Press 0 (**RUN DIAGNOSTIC ROUTINES**) then press Enter.

Compact Printer

SELECT AN OPTION

- 0 – RUN DIAGNOSTIC ROUTINES**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR RELOCATION**
- 9 – EXIT TO SYSTEM DISKETTE**

ENTER THE ACTION DESIRED

? 0

**IS AN IBM COMPACT PRINTER
ATTACHED TO THE ASYNC ADAPTER (Y/N)?**

**DOES THE DISPLAY ASK IF A COMPACT
PRINTER IS ATTACHED TO THE
ASYNCHRONOUS ADAPTER?**

NO Go to page 3-3300-7.

YES 

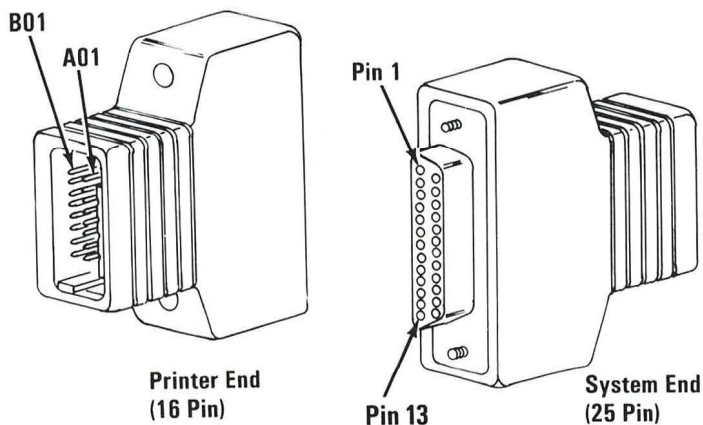


-

-

You may have a problem with the Compact Printer Connector Adapter. Perform the following continuity check.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set the printer's Power switch to Off.
3. Disconnect the printer cable from the connector adapter.
4. Disconnect the connector adapter from the primary Asynchronous Communications Adapter.
5. Inspect the connector adapter for bent or broken pins.
6. Set the meter on the Ohms (x1) scale.



CONTINUE

Refer to the table below, and check the continuity of the connector adapter. The meter should read approximately 0 Ohms resistance.

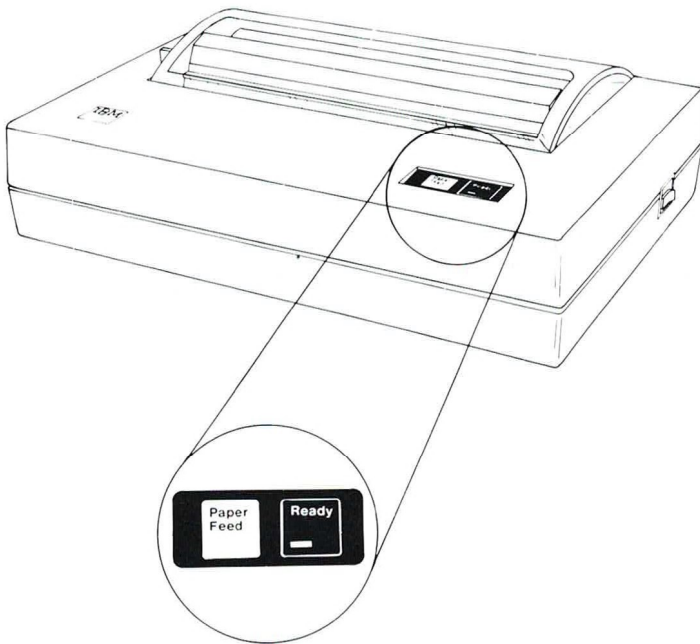
Connector Adapter Continuity Chart		
Printer End (16 Pin)		System End (25 Pin)
A02	_____	20
A03	_____	4
A04	_____	2
A05	_____	8
A06	_____	6
A07	_____	5
B02	_____	7
B03	_____	7
B04	_____	7
B05	_____	7
B06	_____	7
B07	_____	7
B08	_____	7

**WAS THE CONTINUITY OF THE CONNECTOR
ADAPTER CORRECT?**

NO Replace the connector adapter.

YES Replace the logic card (see Section 5).

1. Set the printer's Power switch to Off.
 2. Remove the printer's top cover (see Section 5).
 3. Replace the logic card (see Section 5).
 4. Install the printer's top cover.
 5. Set the printer's Power switch to On.
-

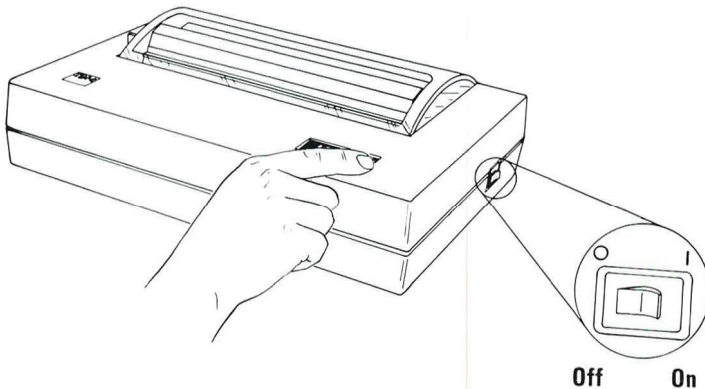


IS THE READY LIGHT ON?

NO Replace the IBM PC Compact Printer.

YES The problem has been corrected. Repeat the test on page 3-3300-6 to ensure that the IBM PC Compact Printer is operating correctly.

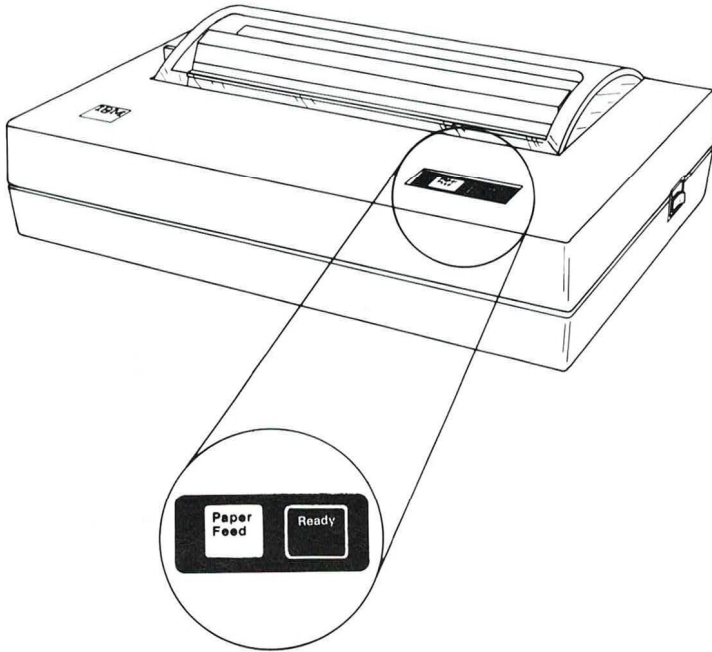
1. Set the printer's Power switch to Off.
 2. Remove the thermal forms from the printer.
 3. Insert a sheet of plain bond paper into the printer.
 4. Press and hold the Paper Feed button while setting the printer Power switch to On.
 5. Allow the printer to run for the entire sheet of paper, and then set the printer's Power switch to Off. (No printing will appear on the non-thermal paper.)
-



CONTINUE



1. Remove the plain bond paper and install the thermal forms into the printer.
2. Press and hold the Paper Feed button while setting the printer's Power switch to On.



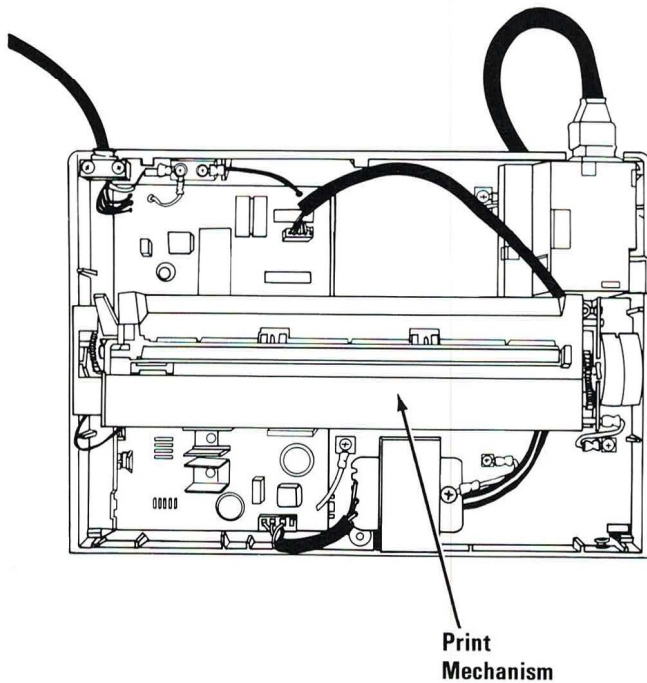
Compact Printer

DOES THE PRINTER BEGIN TO PRINT?

YES Go to page 3-3300-2.

NO

1. Set the printer's Power switch to Off.
 2. Remove the printer's top cover.
 3. Inspect the print mechanism for:
 - Any weak or broken springs
 - Any worn or broken gears
 - A damaged platen
-



ARE ALL OF THE PARTS IN GOOD CONDITION?

NO Replace the print mechanism (see Section 5).

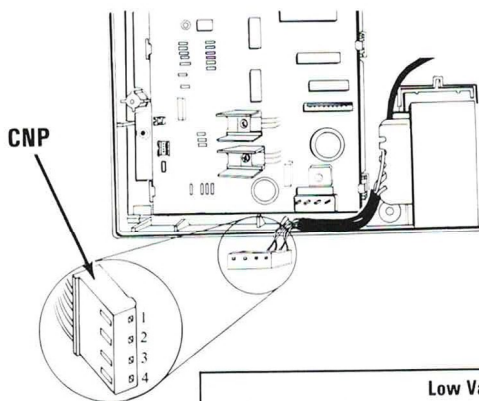
YES



1. Disconnect the CNP connector from the logic card (see Section 5).
2. Plug the printer's power cord into a properly grounded outlet.
3. Set the printer's Power switch to On.

DANGER
LINE VOLTAGE IS PRESENT ON THE
POWER SUPPLY CARD AND
TRANSFORMER ASSEMBLY.

4. Check the CNP connector for the voltages listed below.



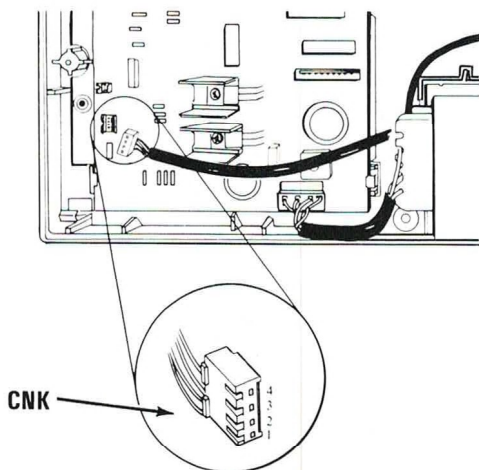
			Low Vac	High Vac
Pin 1	to	Pin 2	14.5	16.0
Pin 3	to	Pin 4	9.0	10.5

**ARE THE VOLTAGES WITHIN THE LIMITS
 SHOWN IN THE TABLE?**

NO Replace the IBM PC Compact Printer.

YES

1. Set the printer's Power switch to Off.
 2. Disconnect the CNK connector from the logic card (see Section 5).
 3. Measure the resistance on the CNK connector while pressing and releasing the Paper Feed button.
-



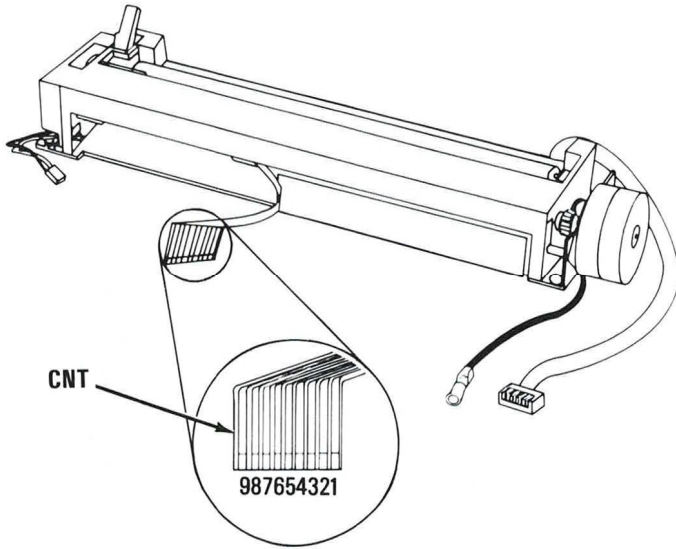
		Low Ohm	High Ohm
Pin 3	to Pin 4 (Pressed)	0	2
Pin 3	to Pin 4 (Released)	∞	

ARE THE RESISTANCE READINGS WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the IBM PC Compact Printer.

YES

1. Set the printer Power switch to Off.
2. Disconnect and remove the print mechanism.
3. Measure the resistances on the CNT connector and compare them with the ranges listed below.



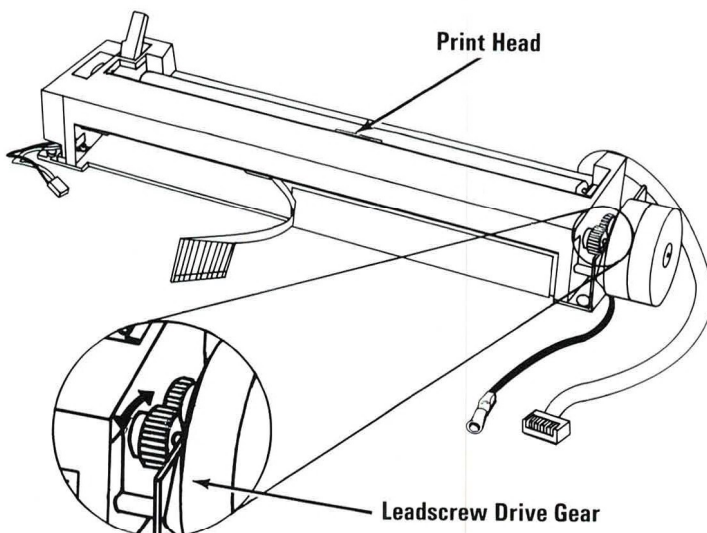
		Low Ohm	High Ohm
Pin 1	to Pin 9	36	50
Pin 2		36	50
Pin 3		36	50
Pin 4		36	50
Pin 5		36	50
Pin 6		36	50
Pin 7		36	50
Pin 8	to Pin 9	36	50

ARE THE RESISTANCE READINGS WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the print mechanism (see Section 5).

YES

Rotate the leadscrew drive gear in both directions.



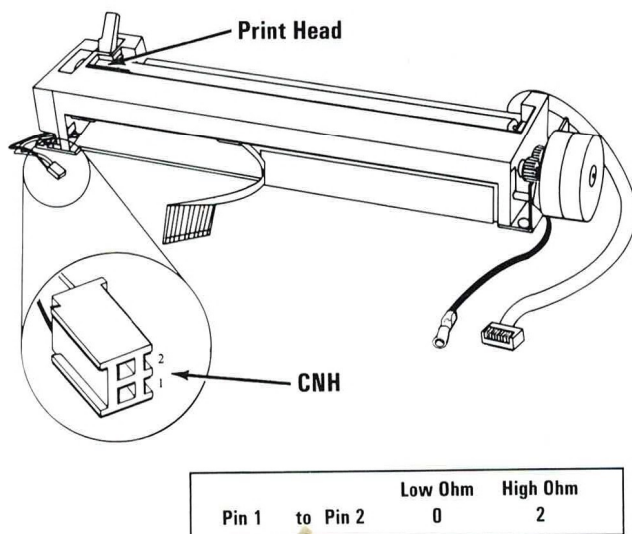
DID THE PRINT HEAD MOVE SMOOTHLY IN BOTH DIRECTIONS?

NO Replace the print mechanism (see Section 5).

YES



1. Rotate the leadscrew drive gear clockwise to move the print head to the leftmost position.
2. Measure the resistance on the CNH connector between pin 1 and pin 2.

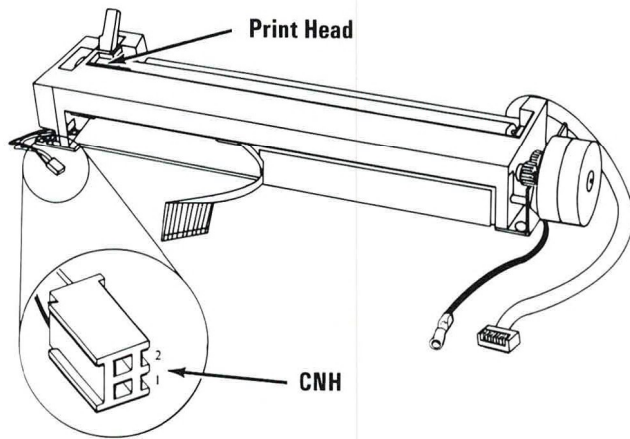


**IS THE RESISTANCE READING WITHIN THE
LIMIT SHOWN IN THE TABLE?**

NO Replace the print mechanism (see Section 5).

YES

1. Rotate the leadscrew drive gear counterclockwise to move the print head approximately one inch from the left side frame.
 2. Measure the resistance on the CNH connector between pin 1 and pin 2.
-



Pin 1	to	Pin 2	∞
-------	----	-------	----------

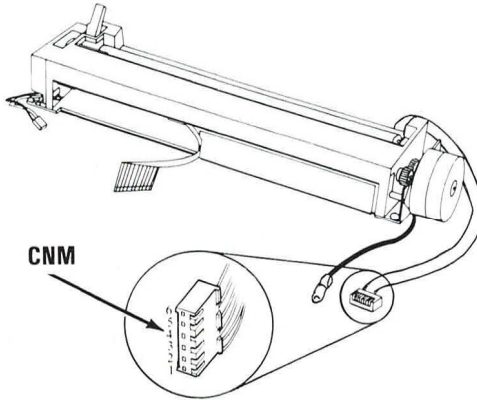
IS THE RESISTANCE ON THE CNH CONNECTOR INFINITY?

NO Replace the print mechanism (see Section 5).

YES



Measure the resistances on the CNM connector.



		Low Ohm	High Ohm
Pin 1	to Pin 3	24	36
Pin 1	to Pin 5	24	36
Pin 2	to Pin 4	24	36
Pin 2	to Pin 6	24	36

ARE THE RESISTANCE READINGS WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the print mechanism (see Section 5).

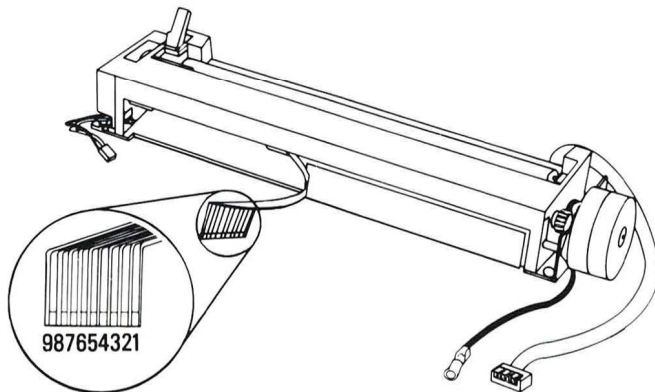
YES Replace the logic card (see Section 5).

Failure Symptom Table

Failure Symptom	Go To Page
Print Dots (Missing, Extra or Random)	3-3300-21
Erratic Carriage Motion	3-3300-21
Print Quality	3-3300-22
Forms Feeding (Erratic or No Feeding)	3-3300-23

Print Dots

1. Set the printer's Power switch to Off.
 2. Remove the printer's top cover.
 3. Disconnect and remove the print mechanism.
 4. Measure the resistances at the CNT connector.
-



		Low Ohm	High Ohm
Pin 1	to Pin 9	36	50
Pin 2	↓	36	50
Pin 3		36	50
Pin 4		36	50
Pin 5		36	50
Pin 6		36	50
Pin 7		36	50
Pin 8	to Pin 9	36	50

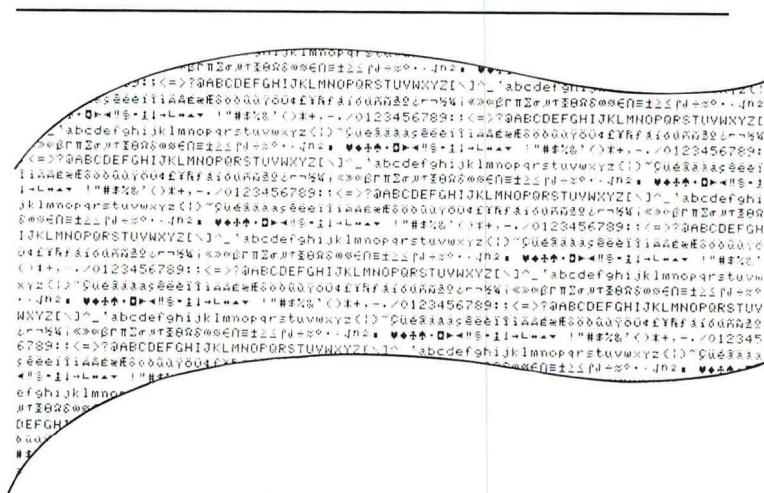
ARE THE RESISTANCE READINGS WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the print mechanism (see Section 5).

YES Replace the logic card (see Section 5).

Print Quality

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set the printer's Power switch to Off.
3. Disconnect the printer cable from the primary Asynchronous Communications Adapter.
4. Replace the forms in your printer with new forms.
5. Press and hold the Paper Feed button while setting the printer's Power switch to On. (This starts the Printer Self-Test. End the test by setting the printer's Power switch to Off).



DOES THE PRINT QUALITY PROBLEM STILL EXIST?

NO The problem has been corrected.

YES Replace the print mechanism (see Section 5).

Forms Feeding

Inspect the forms path for any obstructions.

Note: Forms must be aligned parallel to the sides of the printer for proper feeding.

WERE THERE ANY OBSTRUCTIONS?

NO Replace the print mechanism (see Section 5).

YES Remove the obstructions.

Notes:



Reader's Comment Form

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1502335

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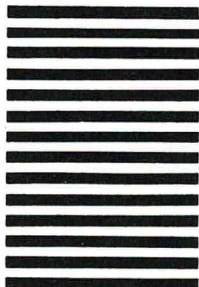
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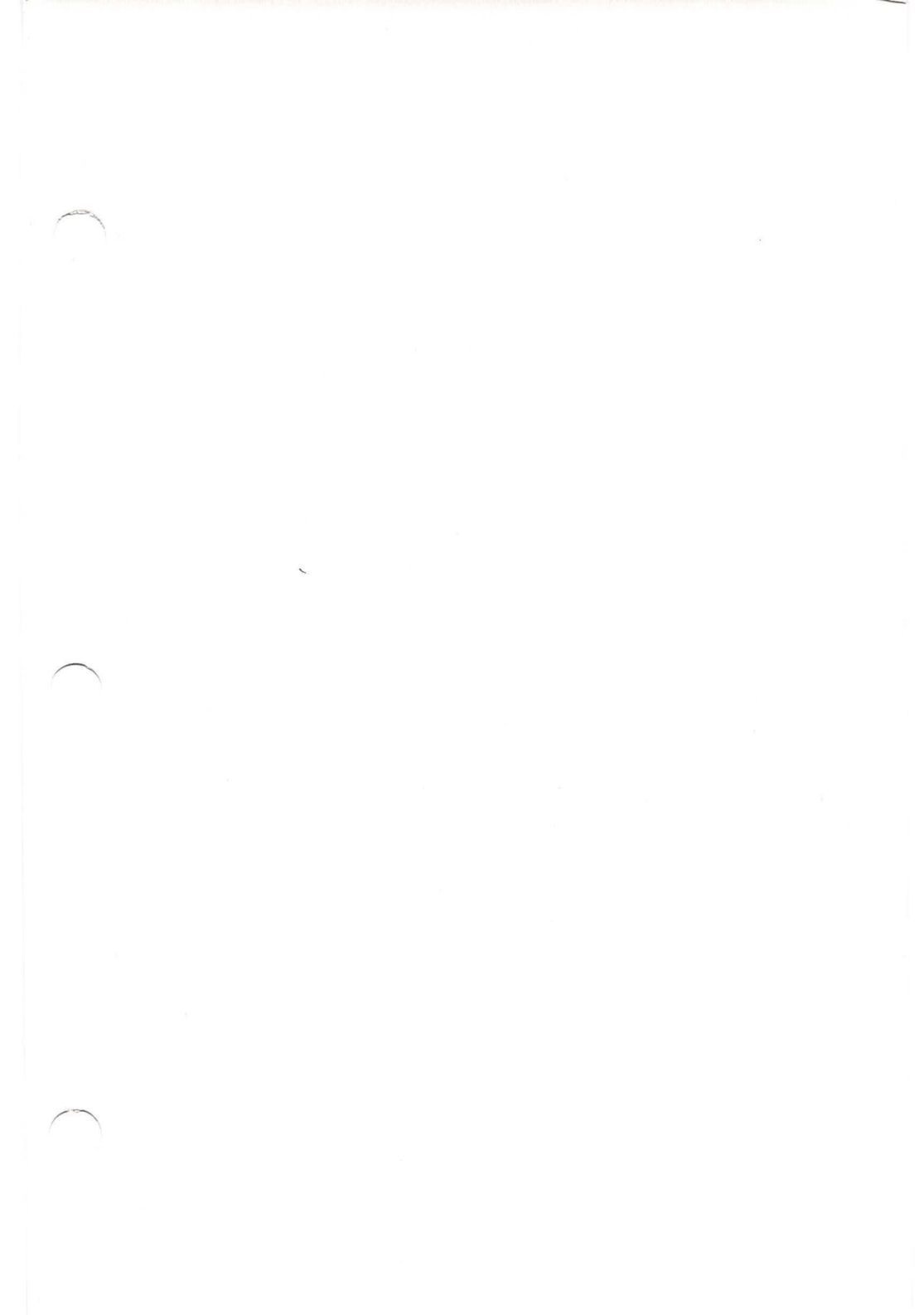
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